

The cover features a microscopic image of plant cells. The top half is white with a light blue overlay of cell walls. The middle section is a yellow-green background with a brown overlay of cell walls. The bottom section is a solid teal color. The text is overlaid on these sections.

# Asian Biotech

ETHICS AND COMMUNITIES OF FATE

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*An Analytics of Biotechnology  
and Ethics at Multiple Scales*

The dispersal of genetic science across the world raises questions about the interactions of biotechnologies and bioethics in diverse global locations. Yet the tendency has been to think in terms of general rules for governing the proliferation of scientific and commercial uses of biological resources. For instance, at the 2008 meeting of the World Economic Forum in Davos, a panel proposing “Rules for the Genomic Age” issued this statement:

Genetic data about specific populations may soon be in the hands of a wide variety of interested players from pharmaceutical firms to insurance companies for scientifically and commercially valid reasons. How should access to, and the application of, this information be managed to both promote collaborative innovation and address societal concerns?”<sup>1</sup>

It is perhaps not surprising that meetings dominated by pharmaceutical interests do not list the nation-state as an interested player, nor is there any mention of resurgent nationalism and ethical debates in non-Western contexts as influences in the uses and effects of the biosciences. Even academic research has struggled to keep abreast of recent events that highlight the complex intersections of the life sciences and ethical dilemmas in Asia:

1. At the turn of the new century Singapore launched Biopolis, a biomedical research hub that seeks to combine researchers from the public and private sectors. The government boasted about the

“state-of-the-art infrastructure including shared resources and services catering to the full spectrum of R & D activities and graduate training.” Stunning buildings with names like Genome, Matrix, Nanos, Centros, Helios, Proteos, Neuros, and Immunos house a spectrum of research institutes, many led by “world-class” (a favorite term) scientists from around the world. The complex has overcome initial global skepticism to win accolades such as “a high-tech heaven” and “Asia’s biotech tiger,” and to advertise itself in *Science* as “the Biopolis of Asia.”<sup>2</sup>

2. Shortly after scientists on the Human Genome Project released a rough draft of their report in 2000, China was the only developing nation to contribute to ongoing sequencing. The Beijing Genomics Institute has since sequenced the genomes of the cucumber, the giant panda, an ancient human, and many microbes. Called “the sequence factory,” the BGI is expected to surpass the total sequencing output of the United States.<sup>3</sup>
3. In early 2004, a scandal roiled the stem cells world, when the sensational claim of the South Korean scientist Dr. Hwang Woo-Suk, to be the first to clone a human embryo, was exposed as fraudulent. The research reported in two papers published by Dr. Hwang’s team in *Science* was later revealed as fabricated. Not only was this scandal a major blow to South Korean science, it also raised ethical questions about lab practices surrounding the donation of human eggs.<sup>4</sup> The event cast an international spotlight on South Korea’s quest to build a “world stem cell hub with new labs in California” and to influence global perception of “different ethical norms” for biomedical research in Asian sites.<sup>5</sup>
4. More recently, in 2007, stem cell research made a major advance in Asia. In Japan, Shinya Yamanaka successfully reprogrammed skin cells to produce stem cells, thereby expanding the toolkit beyond the use of human embryos in research. Although an American team also made a similar discovery at the University of Wisconsin, Yamanaka has single-handedly put Japan on the cutting edge of scientific research by developing an alternative technique to induce pluripotent stem cells.<sup>6</sup>

This book responds to the urgent need for examining the deployment of biotechnologies in economic growth, biosecurity, and ethi-

cal configurations in contemporary Asia. Its chapters present ethnographic studies of biotech projects in Asian countries, but also identify their convergence in practices of ethical reasoning. Some of the contributions to the volume report a trend in state entrepreneurialism that makes biotechnological innovations the new model for cutting-edge capitalism. At the same time, contributors frequently link biotechnologies in Asian contexts to issues of national security and management of a risky future.

There are growing efforts to make connections between the new tradability of “bio” in the bioeconomy and the securitization of “bio” in biopolitics. Crucially, for Asian states, biotechnologies are not merely about the transformation of nature into market shares, but also biosecurity mechanisms aligned with nationalist projects. For instance, as a region of postcolonial emergence, of “uncanny surplus” in population and pandemics, and ascendant nations and megastates, Asian countries treat their populations as a political artifact of risk and opportunity, as well as a fertile source of potential material and ethical values. The new biotechnologies, moreover, enable the materialization of an expanding national field of power that articulates nonmaterial values such as collective imaginings and affective mappings of identities.

While specific biotech policies and styles vary by the Asian countries considered here, there is a convergence of political thinking and of uses of the life sciences that articulate regimes of risk management and thus reinforce feelings and convictions about the collective fate—productivity, wealth, health, and security—of certain populations. By “communities of fate” I refer to three kinds of communalism that can be enhanced, invoked, and given new life through the deployment of biotechnologies, genomics, and molecular sciences. First, postcolonial nationalism in Asia is fundamentally about the regeneration of political and cultural communities on the global stage. As state-led enterprises, biotechnologies are allied to nationalist efforts to overcome past humiliations and to restore national identity and political ambition. The examples mentioned above all register a deep nationalist fervor in the race to be “number one” in cutting-edge sciences, with its promise of a lucrative science-driven economy.

Second, less obvious to outside observers are the social and symbolic effects of biotech innovations, the different ways biological anxieties get worked into biotech projects. Recent experiences of epidemics, new

demands for biomedicine tailored to Asian populations, and an overriding sense of living with biological risks have instilled a need for greater biosecurity. Biotech enterprises are perceived to have the added value of enhancing human security and are thus legitimized as a necessity for emerging nations to combat certain biological vulnerabilities. Different kinds of biotechnology respond to national anxieties about food supplies, diseases, epidemics, and the still-unknown biological crises of the future.

Third, the assembling of databases and pharmacogenomics reinscribe traditional beliefs about ethnicity, nation, and even race, thus giving a molecular cast to collective fate at shifting and multiple scales. There are real differences among Asian situations, each shaped by a particular assemblage of technology, politics, and ethics.<sup>7</sup> In many cases, the articulation of biotechnologies and risk calculations stirs deep feelings about shared fate, and crystallizes new ethical configurations as “life” takes on new meanings, from ethnic inheritance to future present risk. But before I turn to a discussion of ethical practices thus mobilized, I will define the different forms of biotechnologies in question.

“Biotechnology” is defined in the *American Heritage Science Dictionary* as “the use of biological substances or techniques to engineer or manufacture a product or substance, as when cells that produce antibodies are cloned in order to study their effects on cancer cells.”<sup>8</sup> To put it simply, “biotechnology” refers to technology that makes use of biology, as in the production of genetically modified (GM) foods and bio-fuels, and especially in the production of drugs and the engineering of therapies. Thus, biotechnology is involved in broad swaths of contemporary living. Biotechnology is also associated with biosecurity systems (such as surveillance tools and military capabilities), the efficiency of production systems, and consumer lifestyle choices in relation to food, energy, and medicine. Furthermore, today, the biological sciences have become digital and computer-intensive, and computational biologists are able to simulate experiments, predict outcomes, and design miniaturized devices and microorganisms for treating patients. The impact of computational biology for notions of what it means to be human is enormous, but the geopolitical context of technodecision and technoimplementation shapes the broader implications of such experimentations.

The biotech innovations in the above examples illustrate the inter-

play of nationalist security interests and scientific entrepreneurialism in many Asian sites, and the fraught outcomes of the specific ventures that ripple beyond the field of biosciences. The chapters that follow index developments in different biotech fields: genetically modified foods, clinical trials, stem cells research, drug consumerism and regenerative medical tourism, blood donation and banking, and pharmacogenomics and genetics research. These biotechnologies are investigated in complex evolving milieus, all already entangled with sovereign reason, neoliberal logic, and the logics of collectivist ethics. A major goal of the volume is to present recent ethnographic studies on specific contexts of claims about the ethical in and for Asian biotechnologies.

Although each chapter focuses on one kind of material technology or biotech field, in actuality different kinds of biotechnologies can be found in various combinations in the same country. The availability and uses of different forms of biotechnologies reflect state strategies in shaping biotech niches, but also divisive ethical practices that articulate different modes of bioeconomy. There are significant divergences in the extent of state involvement and the spillover effects of specific programs beyond the immediate experimental fields.

Nevertheless, despite political, programmatic, and social differences in each country's biotech revolution, this scientific turn articulates a transcendental notion of emerging Asia. The term "Asian biotech" captures some important points of convergence across this diversity in the biotech industry. First, the emerging combination of biotech expertise, national politics, and collective interests is constitutive of an "emerging technoscientific cosmopolitan world."<sup>9</sup> "Asian biotech" denotes a regional sphere of scientific imagination and endeavor. This is a historical moment when biotechnologies articulate powerful nationalist aspirations in newly affluent Asia. Indeed, Asian imaginations of "the West"<sup>10</sup> as the original source of biological sciences, and the negative Western judgments of Asian knowledges, shape the global context within which individual Asian countries position and project the life sciences in their own rise as modern nations. The biotech revolution represents a "Sputnik opportunity" for Asian states seeking to "catch up with" and potentially surpass "the West." By deploying a mix of neoliberal logics and molecular science, ambitious Asian states are reconfiguring the risks of surplus populations and surplus needs into biotech opportunities for growth and security.

Second, while global attention has focused on Asian commercialization of biological forms, biotech projects articulate biorisks that menace Asian futures, and are thus entangled with processes of ethical reasoning at many scales. In this diverse yet converging region of biotechnicity, the ethical reasoning surrounding science-driven politics, ethics, and sociality links moral subjects and collectives from kinship to nation and beyond. This collection of studies traces experiments with bioeconomies and tracks emerging ethical configurations that link regeneration, bioresponsibility, and biosecurity to the political constitution of subjects and communities of fate.

Finally, while biotech-related ethical processes are located in the specificity of contemporary Asia, I propose a generalizable analytics of ethics that can be divorced from particular Asian contexts and applied productively to other sites and moments of biotech and biopolitical governance.

### *Technology and Ethics*

The yoking of bioeconomies and collective ethics may seem paradoxical, since many Marxists, sociologists, and social scientists tend to view technologies—in this case, political, neoliberal, and biotech—as forms of cold, instrumental materialism that cannot be aligned with ethical values. Indeed, as debates in the United States have shown, biotechnologies are widely viewed as a broad endangerment of ethical forms and human freedom, an overcoming of individual will by mechanic will to power. The Western liberal tradition of viewing machines as a threat to man, reinforced by George Orwell's *1984* and Aldous Huxley's *Brave New World*, is a specter that haunts modern Western consciousness.<sup>11</sup>

Such fears have influenced science and technology studies, which assume that nature/culture divides permeate epistemological and ontological claims of self, science, and beyond. The leading feminist scientist Donna Haraway has been both prescient and courageous in challenging science studies scholars and public activists on their beliefs in a fundamental nature/culture divide and taking a resolutely antitechnology stance. She argues that many of these scholarly and activist approaches make claims and arguments based on their own fear of recognizing the hybrid quality of human/nonhuman technology/bios. Because of culture's history of fiddling with nature, she argues, we are all entangled nature/culture subjects, or cyborgs.<sup>12</sup> Indeed, feminists and

anthropologists have long viewed technology and ethics as mutually constitutive, and yet the exploration of ethics—a question of how to do the right thing in biosciences—beyond the clinic and the public has yet to engage nationalist and geopolitical issues.

In contrast to the skepticism and unease of the West, the embrace of Western technology by Asian countries seems overly determined by dual effects of Western imperialism and nation-building. For over two centuries, Western science and technologies were instrumental in facilitating European domination of Asia. To fend off Western encroachments, Japan became the first Asian nation to industrialize,<sup>13</sup> thus inspiring postcolonial countries to seek Western knowledge as a tool of national empowerment. A pragmatic and flexible approach to modern technology gave rise to the Asian tiger economies in the 1970s, first South Korea, Singapore, Hong Kong, and Taiwan, and in the 1980s, Malaysia, Thailand, Indonesia, and post-Mao China. Scientific gains in education, industry, and research gave concrete expression to the modern state's efforts in ensuring the future of their citizens. By 2010, China's accelerating economy had overtaken Japan's, becoming the engine that drives Asian (and global) economic activities.<sup>14</sup> Now as Asian nations shift beyond manufacturing to knowledge-based industries, they turn to biotechnologies for diagnostic tools and solutions to problems of life and national prowess. One should note that Asian attitudes toward modern technologies had not always been unambiguous. Deep tensions between Western rationalities and cultural values had long festered in China,<sup>15</sup> and not until the late twentieth century did the necessity of modern science for national empowerment largely silence lingering doubts. As in the West, there is recognition that modern technology endangers ethics, but ethics disarticulated from modern science does not appear to be a real option for the emerging world.

In truth, East Asian leaders are dazzled by the economic, social, and political gains that can stem from developing scientific expertise and knowledge. In science parks from Singapore to Shanghai, scientists are viewed as demigods and national heroes. Scientific work in converting nature into products is celebrated for its patriotic contribution to economic growth and for its ethical quest to treat diseases endemic in the region. For instance, the Singapore doctors who died in the course of dealing with the outbreak of severe acute respiratory syndrome, or

SARS, are honored as self-sacrificing patriots.<sup>16</sup> In a different example, before his fall from grace, Dr. Hwang Woo-Suk had a large fan club promoting Seoul as a world-class stem cell hub. Indeed, despite the devastating effects of accidents and pollution associated with rapid industrialization, and rigorous protests by public intellectuals, biotechnologies are not generally viewed in dystopian terms. Rather, there is a sense that biotechnologies are clean and innovative, flexible and versatile, bringing cutting-edge science to newly affluent populations. In South Asia, the populist dazzle is focused more on nuclear scientists than on clinicians; and while environmental movements led by charismatic environmentalists have caught international headlines (the movement against dams is one example), there is no mistaking the vital role of laboratory science in leveraging national prestige in the region.

Despite uneven achievements in biotech development across Asia, there is a common conviction that biotechnology is a necessary tool for defining and solving problems of national and collective interests. Biotech forms are not introduced in a purely technical context, but are always already enmeshed with preexisting social norms, cultural beliefs, and political goals. Their comingling crystallizes situated conditions for shaping life and its various implications for communities of fate mapped at different scales. The political tendency among the elites is not to question the compatibility of technologies and modern solidarity, but to deploy rational and materialist justifications for reinforcing the commitments of subjects, and for configuring a spirit of commonality and nationalist futures.

### *An Analytics of Ethics*

While the ethical processes discussed in this book are located in the specificity of contemporary Asia, the studies taken together make the case for a more generalizable analytics of ethics beyond the region. Before enlarging on that ethics, I will briefly review different anthropological diagnoses of contemporary ethics associated with biotechnology and then propose the alternative analytics, which I call situated ethics.

#### ETHICS AS MORAL CRITICISM

A popular anthropological perspective has tended to find multiple examples of morally condemnable biotech conduct measured against a universalizing moral philosophy. In North America, bioethics tends to

be narrowly focused on protecting the rights of individuals and of historically discriminated groups. For instance, besides the worry over the informed consent of patients and experimental subjects, debates have focused on customized drugs that target certain racial or ethnic groups. A report on “medical apartheid,” for example, exposes the history of inhuman medical experimentation on African Americans.<sup>17</sup> New medical procedures and drugs stir fear that “misleading correlations of race, genetics, and behavior” will foster racist mistreatment at the hands of the law and penal system.<sup>18</sup>

The exposure of shocking misuses of research and biomedical practices has become a common anthropological project. Nancy Scheper Hughes has tracked black markets in organs that depend on kidnapping, trickery, and physicians’ complicity to generate volunteers who wish to sell their body parts. She notes that even when regulations are in place, the lines between ethical donation and commercialized trading are becoming blurred because of the acceleration of the global traffic in organs.<sup>19</sup> Global pharmaceutical companies (collectively known as “Big Pharma”) are also viewed as increasingly unreliable in protecting human bodies and as exercising a form of discriminatory “ethical variability” around the world. Noting the proliferation of opportunities for clinical trials in poor countries, Adriana Petryna and others have framed the ethical question as a matter of who gets treated and who doesn’t; who is exploited for bioresources and who gains?<sup>20</sup> In such studies, the anthropologist is presented as a watchdog of ethical violations, or as a moral actor helping to forge ethical resolutions for more equitable distribution of value between donors and experimental subjects, on the one hand, and predatory commercial and medical entities, on the other.

Another related moral critical approach firmly situates biotechnologies as elements in contemporary capitalism, and thus allied to exploitative logics. Catherine Waldby and Robert Mitchell have argued that biotechnological forms and practices have become inseparable from the generation of “biovalue” that is produced when “the generative and transformative productivity of living entities can be instrumentalized along lines that make them useful for human projects—science, industry, medicine, agriculture or other arenas of technical culture.”<sup>21</sup> The capture and use of human organs in a “tissue economy” maximizes their productivity through “circulation, leverage, diversification, and

recuperation,” thereby creating a hierarchy of values for these organs.<sup>22</sup> Kaushik Sunder Rajan more rigorously pursues the connection between markets and the life sciences, claiming that capitalism “overdetermines the emergence of new technoscience.” He has identified a biotechnology-driven form of capitalism that has engendered novel forms of “alienation, expropriation, and divestiture” that go beyond Marx’s formulation of exploitation.<sup>23</sup> Despite their critique of biocapitalism, Waldby and Mitchell, on the one hand, and Sunder Rajan, on the other, are also aware that global tissue and biotech networks have an effect on the politics of life and subject formation. Waldby and Mitchell note that the susceptibility of even altruistically donated tissues to global commercialization is nevertheless tempered by the flourishing of a tissue economy and alliances between commercial and civil society interests.<sup>24</sup> Sunder Rajan notes that the biotech-based markets shape new “individual and collective subjectivities and citizenships.”<sup>25</sup>

This moral evaluation of commodified biotech systems becomes more nuanced in studies that see complex ethical possibilities associated with the use of transplant or reproductive technologies. Participation in intrusive surgery can involve a form of ethical self-validation. Charis Thompson has noted that biovalue produced by regenerative medicine exceeds market processes condemned by Marxist scholars. The “biopolitics of reproduction,” she argues, captures forms of value intrinsic to life-giving potential. “Reproductive intrinsic value is self-validating and is not dependent on a community of experts and evaluation of skills.” Furthermore, she notes, the productivity of stem cell research is not focused on immediate profit making, but is future-oriented with regard to “knowledge, technologies of life, and promise.”<sup>26</sup> In this debate, there are interconnections between the production of biovalues and other kinds of ethical values beyond the strictly economic, including the symbolic value of life generation. Even at the molecular level, as Sarah Franklin has noted, genetic information is inherently inflected with specific aims and relationships that maintain social and political claims.<sup>27</sup>

When the viewpoint is enlarged beyond the laboratory, ethical decisions become negotiative practices with circles of significant others. Lawrence Cohen observes that the status of “operability” of poor Indians induces them to supply the growing market in kidneys. However,

a decision to sell one's kidney for cash is often recognized as an act of sacrifice and love made within the moral economy of kinship. "Sellers usually sell to support loved ones, particularly in conditions of everyday or extraordinary debt."<sup>28</sup> Here is an important reminder that decisions surrounding the use of biotechnologies can have profound ethical implications that spill beyond the isolated patient or donor.

Thus, any mode of moral reasoning in a biotech setting articulates bioethics in the narrow ethical sense, and perhaps even more urgently in preexisting ethical scales beyond the clinical subject. An anthropological inquiry into ethical practices would examine how bioethical norms that regulate clinicians' practices and patients' choices unavoidably involve broader ethical considerations that spiral beyond the lab and the clinic. A new donor ethics in the United States is the "kidney daisy chain," whereby a donor whose kidney is not compatible with an intended recipient (usually a relative or friend) gives her organ to a more compatible patient. This anonymous gift triggers new donations by the loved ones of the recipient patient, thus generating a chain of donors and transplants.<sup>29</sup> The kidney daisy chain is a great example of how the bioethics of kidney donation (voluntary informed consent) articulates with an ethics of indirect reciprocity derived from kinship and altruism.

#### BIOMEDICAL LIBERALISM

Another approach ties contemporary biomedical practices largely to ethical expressions of liberal individualism. Following Foucault, scholars claim that individual choice, informed consent, and other forms of "nondirectness" express the very essence of "governmentality." Thus, contemporary techniques of governmentality exercised in the field of biomedicine represent an emergent form of governmentality that is free of state constraints.<sup>30</sup> Rose and Carlos Novas invoke the notion of "biological citizenship" to describe a process whereby patient groups in Britain both make claims for resources and challenge experts and authorities on health policies. They maintain that these medical consumers generate a kind of "public value" vis-à-vis the authorities.<sup>31</sup> Elsewhere, Rose asserts that the devolution of many responsibilities of the social state to quasi-autonomous bodies places increasing emphasis on self-management with a prudential focus on one's own future se-

curity.<sup>32</sup> This view of contemporary ethics follows Foucault's claim that liberal freedoms of self-constitution are autonomous of state power, leading to an eventual "'governmentalization' of the state."<sup>33</sup>

Ethnographic research in an array of settings, however, reveals a lacuna in the critique of ethics and the liberal individual perspectives, both of which ignore or reject ethical processes involving the state. The demands of self-managing subjects, after all, frequently involve claims on the state power and its capacity to respond to citizens' health demands. In her study of the Chernobyl meltdown, Adriana Petryna observes that victims were able to claim biomedical resources, social equities, and human rights from the state.<sup>34</sup> Her notion of biological citizenship allows for and addresses issues of sovereignty in a much more thorough way than Rose and Novas—who borrowed her concept—allow. As Mitchell Dean argues, biopolitical choices are claims on the appropriation and use of organized resources of the government, and also the political means "by which a settlement to a struggle can be forcibly imposed," adding that "what is at stake are often matters of life and death."<sup>35</sup>

#### SITUATED ETHICS

As an alternative to the perspectives described above, which make ethical judgments about particular ethnographic situations; seek to rectify them according to some universalizing ethical standard; or link biotech innovations to ethical possibilities of self-validation or enhancement of liberal subjectivity, I propose an analytics of situated ethics. Indeed, the anthropology of science and social medicine have long questioned the "coherence" model of philosophers, and anthropologists have variously posed relational and situational ethics as counters to the claims of universal systemic ethics.<sup>36</sup> This anthropological approach has focused on cultural (gender, ethnic, and racial) differences in ethical reasoning. But in contemporary conditions of heterogeneity, flux, and uncertainty, we cannot proceed from a position of stable or standardized props of culture. Rather, "ethics" become part of tentative experiments with heterogeneous elements that are amenable to control and valuation. Stephen J. Collier and Andrew Lakoff have suggested that an analytics of situated forms of moral reasoning ("regimes of living"), by resolving problems at hand, provides possible guides for ethical action. In contemporary times, this alternative vantage point

would consider the rise of technology and biopolitics as “sources of dynamism that are critical to understanding how the constitution of ethical subjects, forms of ethical reasoning, and practices of living with respect to the good are at stake today.”<sup>37</sup> My concept of situated ethics takes the emergent assemblage of diverse logics as the space and tension within which moral reasoning takes place, and is woven into overlapping contexts of technology and sociality. Several theoretical insights drawn from research on situated ethics in Asian biotech assemblages have greater applicability beyond the region. The following are not mutually exclusive but concern coexisting social phenomena.

First, an analytics of ethical practices dives below schematized descriptions of expropriation and alienation in biotech enterprises. Instead of proceeding from a position of moral certitude to make judgments about particular ethnographic situations or seek to remedy them according to a universal set of ethics, an anthropology of ethics is necessarily about locating ethical practices, that is, tracking ethical configurations where “ethicalizing” processes and decisions take place. Situated ethics happen at the intersection of competing logics of politics, technology, and culture. Overlaps and tensions between multiple ethical regimes are conditions within which moral decisions are made for solving a particular bioethical dilemma.

Second, moral reasoning, I maintain, is located not in the empirical individual, but in the space of convergence or contestation between shifting scales of ethical life. The classic question “What is the good life?” should be reposed as “What is the good life for my family, community, people, humanity at large?,” depending on the context of broader engagement or consideration. “What ought I to do (in this moment of ethical decision making)?” takes into consideration how my action would affect these significant others, again at multiple scales of family, ethnicity, or community.

Third, in many unfolding situations, broader ethical scales can be invoked over that of the (presumed) isolated moral person. At various scales, questions about the “ethical decision” or “the good life” for the individual necessarily tack between individual, kinship, and large collectivities of ethnicity and nation.

The ethical critique approach is fixated on the moral subject as the locus of ethical formation, and from that isolated vantage point, makes large abstract claims about universal ethics. Another type of ethical

scaling would merely displace a question from a scale we are familiar with to another one, for example, from self-management (e.g., as in the studies of Rose and Novas) to demands on the state for providing biosecurity (as in Petryna). In sharp distinction, an anthropology of situated practices captures novel forms of ethicalizing in the midst of an assemblage of interacting technical, political, and ethical possibilities. The notion of situated ethics offers a view that takes scale into account, yet cannot be reduced to any single scale, and holds that it is precisely the space between scales where ethical work takes place.

This diagnosis of ethicalization at multiples scales requires that we include state and nationalist collectivities in thinking through risk, biopolitics, and sovereignty. In a powerful and insoluble way, broader scales of ethical reasoning articulate geopolitical stakes of contemporary globalization. In an age of global risk, Ulrich Beck notes, “reflexive modernization” cannot transform uncertainty into issues of order, but has at its profound center calculations and risks in confronting uncertainty.<sup>38</sup> The essays in this volume indicate how each biotech-biosecurity assemblage crystallizes conditions for confronting ethical questions about life, risk, and security that cascade across multiple collectivities. Emerging Asian situations indicate that diverse biotechnologies are not necessarily divergent from ethical possibilities of welfare, security, and identity. Furthermore it remains an open question whether biomedical self-management undermines sovereign power, or whether it can also strengthen the sovereign power’s control of technologies and provision of resources and services when the national interest is also at stake. Such broad ethicalizing processes become interwoven with everyday ethical decisions about biomedicine, biotechnology, and biosecurity, that is, ethicalizing practices at many levels of society that become constitutive of new communities of fate (as I will discuss in more detail below).

### *Subject and Sovereignty*

Genomic science has unleashed infinite possibilities for reworking the “bio” in biopolitics, allowing a combination of different techniques to be exercised in the biotech management of life, and of the self. Foucault notes that biopolitics “is, finally . . . control over relations between the human race, or human beings in so far as they are a species, in so far as they are living beings, and the environment, the milieu in which they

live. This includes the direct effects of the geographic, climatic, or hydrographic environment: the problem, for instance, of swamps, and of epidemics.”<sup>39</sup> Biopolitics are simply the “security mechanisms . . . installed around the random element inherent in a population of living beings so as to optimize a state of life.”<sup>40</sup> If, as Foucault argues, biopolitics is fundamentally an apparatus of security,<sup>41</sup> then how does the biopolitics of security change in an age of genomics and assertive Asian sovereignty?

Foucault himself is complicated and contradictory on the ways in which sovereignty and governmentality might coconstitute each other or at least exist simultaneously. For instance, he has cautioned against a “reductive view of the relative importance of the state” as expounded in Marxist ideas about the state as oppressor.<sup>42</sup> But elsewhere he notes that “in the second half of the eighteenth century, taking responsibility for the population will involve the development of, if not the sciences, then at least practices and types of intervention,” such as social medicine, public hygiene, demography, and so on. Thereafter, “the population as a collection of subjects is replaced by the population as a set of natural phenomena,” that is, as a constituted reality for which the state will have to be responsible.<sup>43</sup> The question is, how to explore Foucauldian ideas about biopolitics, on the one hand, and his assertions about the state role in shaping a biosocial milieu, on the other? An even more challenging task is to interrogate the complex entanglement of biotechniques of subjectivization and sovereign-inflected notions of the national subject. The challenge for analysts is to specify how biopolitics intersects political responsibility, and how the rights of individuals articulate the rights of states.

After Foucault, one may argue, the biopolitics of security must be situated in relation to the geopolitics of state security. For much of the twentieth century, “bio-regulation by the state”<sup>44</sup> was exercised through infrastructural systems, for instance, to protect domestic security against catastrophic threats such as nuclear attacks.<sup>45</sup> Gradually, health security has come to the fore, gaining its fullest realization yet in the new biotech mechanisms that configure new living forms, but such processes and materials increasingly circulate in an international context. Contrary to popular perceptions, the regulation of biotech flows is managed not only by pharmaceutical companies and global health agencies, but also by nationalist states that increasingly shape

and patrol flows of human tissues and biotech products. In contrast to market-state systems, emergent players in the field of biotechnology and biomedicine are situated in political environments with robust sovereignty and paternalist rule. Having laid the foundation for capitalist development, Asian states are turning to biotechnologies as a mechanism of regeneration, not only of the economy and of the people, but also of national prestige.

Asian governments are called “authoritarian” for their explicit expression of a sovereign logic that stresses cultural paternalism and sovereign custody of the population in the space of the nation. “Sovereignist” thinking has been used in reference to those who hold the politico-judicial position that the United States Constitution or “American exceptionalism” takes precedence over certain international obligations.<sup>46</sup> “Asian exceptionalism,” by contrast, identifies a rigorous sovereignty shaped by precolonial political culture and postcolonial regional influence. Contemporary sovereign thinking, especially in East and Southeast Asia, is inextricably linked to deep structures of feeling rooted in old civilizations. In the early modern era, this sense of cultural character vested in the history of kingdoms or empires was violently unsettled by encounters with European colonial powers. Benedict Anderson has emphasized the “imagined community” as a vital practice of contemporary nation building, and indeed, the moral act of imagining a nation into being draws on ancient glories that in contemporary time continue to be animated by master symbols (an Asian example is Tiananmen).<sup>47</sup> Especially for East Asian nations, the imagining has always been infused with biological notions of cultural commonality and political difference.

Sovereign logic in East Asia is therefore in excess of the politico-legal definition of sovereignty found in international law. It includes a robust sense of cultural identity that, however unevenly, invokes a former kingdom or empire. China is the preeminent civilization-state model of how sovereignty shapes a cultural notion of belonging, one that is given visceral force by colonial encroachments in modern times.<sup>48</sup> The political construction of racial and cultural categories as foundational truths reinforces a moral-visceral experience of nation and sovereignty. Cultural notions of the state as a father-protector of ordinary people persist—uncountable failures and betrayals notwithstanding—and

governing is viewed as a form of collective caring from above that engenders a sense of national subjectivity and shared fate. In Southeast Asia, postcolonial nations have been characterized as “strong states,”<sup>49</sup> that is, authoritarian regimes that can maintain a moral order and foster market competition. Cultural authoritarianism from above and collectivist sentiments from below are perhaps more easily aligned in these countries than in Western contexts that celebrate unfettered individualism and participatory democracy. Given the enduring influence of historical and cultural factors of paternalism and dependency, modern East Asian nations emphasize national or state sovereignty over popular sovereignty.

In China’s case, the ever-present memory of humiliations inflicted by the West reinforces the historical, moral, and visceral elements of its cultural exceptionalism rooted in its long continuous civilization and profound sense of cultural superiority. For thousands of years, Confucianism shaped a hierarchical ethical order of mutual responsibilities that instilled a unifying cultural identity among the predominantly Han population. In the twentieth century Confucianism was repeatedly subjected to violent repudiations, but since the era of market reforms, the communist state has resurrected Confucian thinking as a way to strengthen cohesion and support for authoritarian rule.<sup>50</sup> The resolute quest for modern sovereignty is most potent in the nationalist fervor to reunite with Taiwan, an island-nation that has tried to defend its political autonomy.<sup>51</sup> We shall see later this duel between the People’s Republic of China and Taiwan expressed in the realm of DNA research. Furthermore, China’s ascendancy as a world power intensifies its already vigorous sense of state sovereignty. For instance, Chinese foreign relations experts are using an index of “comprehensive national power” to measure the country’s global profile.<sup>52</sup> In addition to the appeal of its gigantic economy, China competes for international influence under the labels of “peaceful rise” and “soft power” by exporting cultural ideas, legitimacy, and foreign aid from its multi-trillion-plus-dollar assets. A prime example of hypernationalism is the Beijing 2008 Olympics, a global coming-out event by which China sought to restore its claim to global stature. Sovereign power has been enhanced by shaping transnational relationships, not diluted by them. An unapologetic focus on national interest prevails not just in China but in much

of Asia, despite the countries' differing political systems. In their different ways, Japan and India, for example, deflect Chinese power by forging alliances with the United States.

The Western legacy in India is markedly different from this legacy in other Asian nations. As Sunder Rajan has noted, the role of the Indian vanguard elite in leading the move against British rule was tempered from the start by the extensive constitutional mechanisms that were enshrined in the imagination of the independent India nation. The tension between a vanguard (rather than paternalistic) ruling elite and populist institutional mechanisms foster conditions for a more participatory democratic sensibility that is more akin to South Africa and Brazil.<sup>53</sup> South Asian states tend therefore to a more contested environment of political stewardship than do East Asian states; their embrace of biopolitical calculations is mainly a jingoistic rhetoric among the highest elites and is not widely disseminated across society.

Nevertheless, both China and India are sensitive about their national identity and political exceptionalism in the world. Whereas Indian sensitivity about its exclusivity is always in tension with its desire to be a "global player" by embracing global values of democracy and free trade, Chinese prickliness about its exceptionalism is more aloof, despite its extensive participation in global trade. These contrasting styles of sovereignty mean that in the area of biotech development, India positions itself as more closely aligned with global pharmaceutical practices and bioethical concerns, while China is more assertive about gaining state control over the knowledge of biotech companies and bioresources in relation to global research and trade. Other Asian nations considered in this volume are situated in the continuum between these two poles of assertive sovereignty. A logic of sovereign exception to pharmaceutical globalization is not so unexpected in an age of Asian emergence.

Sovereign thinking stresses cultural distinctiveness and national territoriality, but when species become the target of biopolitics, technologies of security shift from patrolling borders to controlling the circulation and futures of living bodies. Michael Dillon and Luis Lobos-Guerrero have noted that contemporary biotechnology is concerned not only with regenerative medicine, but exploits the fungibility of species life, that is, the "pluripotency" of stem cells allows a constant instigation of new life forms that can be used in tissue regeneration and

the compression of mortality.<sup>54</sup> In recent decades, the coupling of political entrepreneurialism and the life sciences is extending security mechanisms for trading in and capitalizing on life forms in Asian milieus. As I argue below, genomic sciences allow the translation of a dynamic of surplus and risk into a synergy of fecundity and opportunity.

Biotechnologies unlock the potentialities of Asian bodies either as sites of experimental testing, as values to be harvested, or as consumers of security products. Does the production of biovalue and biotech-driven modes of subject formation challenge sovereign reason? Or do overlapping scales of ethical considerations articulate broad-level concerns about political security and risk? The governing and the governed are variously intertwined in emerging Asian biotech constellations, and no study can ignore their implications for national interest and the ethics of biopolitical belonging.

### *Communities of Fate*

The promise of biotechnology in fostering a continual regeneration of life enhances the logic for ethicalization of the bioeconomy beyond the clinic, the laboratory, and the marketplace. In Asian milieus, biotech mechanisms are presented as ethical operations that link the immediate needs of the individual consumer or patient to the political generation of civic virtue, that is, appropriate conduct and social obligations to contribute to national prosperity and security. Especially in East Asian countries such as South Korea, Japan, Singapore, China, Taiwan, and Thailand, reciprocal relationships (sometimes patron-client ties, other times *guanxi*, or a web of personal connections) cut across public-private spheres. An implicit norm of reciprocity is embedded in the social contract between people and the state, a kind of social cohesion that is often misrecognized as corruption or authoritarian control. In such social contexts, our approach to ethics is not concerned with the repetition of universal norms of bioethics, but focuses on diverse moral reasoning that takes place in overlapping ethical spaces.

The phrase “communities of fate” has been used to denote communities bound by common fortunes and prospects beyond the state and national territory, that is, autonomous political networks of shared fate—represented by nongovernment organizations, environmental movements, human rights entities, and international law. Because of their interest in communities of fate as the building blocks of a

“global civil society,” theorists have written out the vital role of the state altogether in the formation of collective interests.<sup>55</sup>

In my use, “communities of fate” refers not to elements of a global civil society but to the network of collectivities that become connected as a result of diverse ethical decisions and feelings associated with technological innovations. Different forms of biotechnology can be used to manipulate corporeal and affective interests that reinforce a sense of community and shared fate, for instance by activating traditional values of family, ethnicity, and the nation in the course of ethical decision making. At another level, political authorities and venture capitalists variously participate in the ethical legitimation of biotech projects as tools that serve the well-being of individuals and society. The bioeconomy is understood not merely as a generator of profits but also as an ethical machine for solving the problems of health, regeneration, bioresponsibility, and biosecurity.

Doctors, engineers, and scientists have always played leading roles in Asian governments. Political diagnosis invariably uses sciences as both metaphor and technique for solving the myriad problems of welfare, growth, and political legitimacy.<sup>56</sup> The role of scientific knowledge in the success of postcolonial nations begets a powerful emotional resonance especially among the educated elite. From India to South Korea, generations of upwardly mobile parents wanted and continue to want their children to become doctors and engineers to help save and strengthen the motherland. Science and patriotism are tightly intertwined. Biotech modernity is thus the latest in a genealogy of scientific methods that have been central for enhancing and ethicalizing state-led modernization.

In polities shaped by the Confucian ethos, citizens expect the paternalistic state to set ethical norms of social well-being and moral behavior. Modern China has a tradition of mass mobilization campaigns against a variety of political foes, and more recently, for family planning and antismoking campaigns.<sup>57</sup> Singapore is famous as well for its civic campaigns to promote childbirth, marriage rates, and healthy living. Conduct that complies with such stated norms gives ethical visibility to these social goals. Making modern science compelling in its beneficial effects on the population and making healthy living a form of civic virtue are ways of giving visibility to ethical practices that inter-

weave communities of shared fate.<sup>58</sup> Older circles of cultural, ethnic, and civic solidarity offer reinforcements for biotech innovations that raise new ethical questions about relationships between individuals, collectivities, and the nation. These emerging ethical constellations are varied and unevenly integrated across the Asian landscape. There are broad South Asian and East Asian contrasts: in Indian cases, ethical decisions about biomedical procedures tend to operate at the kinship level, whereas in other Asian contexts, individual voluntary decisions tend to take into account broader scales of ethical reasoning in thinking through benefits, risks, and the common good. In this sense, a multitude of micro conducts regarding biotechnologies help to configure new ethical imaginings of shared fate.

### *Asia's Sputnik Moment*

“Asian biotech” refers to an assemblage of science, politics, and collective concerns that configures a realm of transcendent imaginary in which sciences in tandem with ethics shape political identities. From plant genomics to molecular science, a strong sovereign impulse runs through biotech projects in Asia, shaping political meanings of biological problems made visible and solvable by the new sciences.

In the United States, the Soviet launching of the Sputnik capsule spurred American molecular biology to disciplinary dominance in the 1950s. As Lily E. Kay has written, the Rockefeller Foundation and the California Institute of Technology (Caltech) advanced the resulting “new biology” that came to shape an American vision of science and society. The disciplinary matrix of this new biology is governed by a faith in technology over physiochemical processes and submicroscopic processes that can facilitate control of biological destiny.<sup>59</sup>

Conditions in the early twenty-first century are Asia's Sputnik challenge to make a definitive break from heavy industrialization to the frontiers of bioscience. The new biotechnologies originating in the West are viewed as tools not only for creating new commercial enterprises but also for re-envisioning the relationship between politics, science, and ethical regimes. Despite different biotech programs across multiple settings, the scientifically driven imagination of Asian modernity is predicated on a new articulation of sovereignty, biotechnology, and biosecurity that crystallizes a growing sense of shared fate among

peoples in different nations. Specifically, the new biology in combination with politics, collective fears, and sentiments crystallizes conditions for redefining what it means to be both “Asian” and “modern.”

But let us take a moment to note divergences of biotech policy, programs, and scale, specifically how individual countries relate to ideas of the region. The main contrast between India and China is the role of the state in leading biotech development. Both nations emphasize the links between biosecurity and biotechnologies, but their projects, state-market mix, and transnational linkages are very different. The Indian state focus is on nuclear weaponry (supported by the United States), since it is seen as the real assertion of Indian sovereignty in the face of First World global dominance. The fledgling Indian biotech industry has had to confront suspicion and controversy about greedy companies by the authorities, venture capitalists, religious leaders, NGO activists, and the media. As the state struggles to increase genetically modified (GM) food and cash crop production, private companies have focused on clinical trials, medical tourism, and the manufacture of generic drugs. Biotech enterprises are mostly clustered in Hyderabad and Bangalore, but they are also cropping up in Maharashtra and Goa. The private biotech sector tends to specialize in outsourced research from the United States, or is concerned about linking up with global drug companies and global medical consumer markets.

Whereas India positions itself as a biotech node networked with the West, China’s biotech innovations seek to lessen the nation’s dependence on the West and to strengthen its sovereign power.<sup>60</sup> China has raced ahead of Japan to become the second largest investor in research and development, after the United States.<sup>61</sup> Indeed, the Chinese state is a technocracy that dominates all aspects of biotech development, from lunar exploration to nuclear science and life sciences. Key branches of the government (including the Ministries of Science and Technology, of Agriculture, and of Education) control most research and development programs, although regional governments and the National Science Foundation of China also play significant roles.<sup>62</sup> The bioindustry development program is written into China’s five-year plan, and there are currently fifteen major bioindustry bases including Shanghai, Shenzhen, and Beijing. Hundreds of new biotech companies—service provider, innovator, and biogenerics—emerged in 2007 alone.<sup>63</sup> Despite a very uneven regulatory picture when it comes

to R & D, many regional or city governments forge joint venture companies by funneling funds to universities or science parks, thus influencing specific projects and directions of research.<sup>64</sup> Chinese political authorities also tend to shepherd projects toward collaborations with overseas Chinese sites. There are tissue sharing and research links with Singaporean institutions. Increasingly, China and Singapore are linking up over biomedical issues that are viewed as affecting ethnic Chinese on the mainland and in the diaspora.

Biotech nationalism is also pronounced in other East Asian nations. In South Korea, as Hwang's botched research illustrates, the struggle for mastery in cutting-edge science is closely associated with the nation's prestige on the global stage. In Japan, despite decades of impressive high-tech innovations, biotech research has not actively interacted with global interests.<sup>65</sup> The field is dominated by a scientific elite and coddled by the government.<sup>66</sup> This state protectionism has not exposed Japanese pharmaceutical companies to the rigors of global competition the way the Japanese automobile industry has been. In general, East Asian countries (South Korea, Japan, China, Taiwan) tend to be more state-driven in their biotech development and more oriented to regional networks of trade and research than is India, for example.

Despite these differences in types of biotech projects, degrees of state involvement and interconnections, there is a transcendental "Asian biotech" that animates a broader vision of scientific emergence. We find not an overarching biotech logic or a regional integration through science, but a constellation of shared features conditional on political, economic, and practical contingencies. Unevenly but significantly present across Asia, these shared elements are issues of excess, risk, and opportunity; development of biotech hubs; moral reasoning that involves multiple ethical scales; and the use of biosciences to promote biosovereignty.

The elements of a transcendental Asian biotech became more apparent with the formation in 2004 of the Pan-Asia SNPs (PASNP) Consortium. This genomic project was the first to be conceived, funded, and executed by Asians in Asia, as noted by Edison Liu, executive director of the Genome Institute in Singapore and one of the consortium's founders.<sup>67</sup> The human genetic mapping of Asia is a direct response to the grossly simplified representation of Asian genomics depicted by the Human Genome Organization (HUGO). The PASNP consortium extends the study of human genetic diversity to seventy-three Southeast and

East Asian populations. Over ninety scientists, forty institutions, and eleven countries are involved in a collective effort to plot genetic diversity in Asian populations by identifying SNPs—or “snips”—that is, single nucleotide polymorphisms, or variations in our DNA code. The study maps the range of genetic diversity in Asia and traces the genetic origins of Asian populations. A basic goal is to identify gene involvement in a disease or in responses to drugs, and thus in ethnic variations in predispositions to certain diseases or susceptibility to certain drugs.

The PASNP study is also a preemptive strike at mapping diverse Asian biodata before Western corporations gain direct access to their vast market potential. The benefits of the SNPs project will be state control of the treasure trove of biomedical knowledge and maintaining state involvement in pharmacogenetic research and ensuing profits.<sup>68</sup> But Edison Liu told me that “state ownership of DNA is beyond the question of individual paternity [i.e., individual ownership]. There is the ethics element, not reducible to a cash cow for foreign companies.”<sup>69</sup> In other words, the genetic project is a regional collective that operates at multiple ethical registers as well. As the first inter-Asian scientific community, the organization promotes each participatory state’s creation of a national biodata bank, to control potential drug markets, but also fundamentally to promote the development of customized medicines that will benefit Asian citizens and peoples. While still in its early stages, the consortium creates a regional ethical space that seeks to protect, at multiple political levels, the health and biological resources of Asian populations from the manipulation and predation of global pharmaceutical firms. The critical importance of scientific research and talent in emerging countries was acknowledged in 2008 when Liu was selected as president of HUGO, the Human Genome Organization, which has since moved its office from London to Singapore.

Beyond the mapping of Asian genetic diversity, other converging features crystallize conditions of possibility for the broader configuration of common interests and imagination that we call “Asian biotech.”

In this section, I move from the exposition of the analytics of biotechnology and bioethics to their particular articulation in different parts of the book. Particular chapters will be discussed within the

themes of excess and opportunity, the rise of biotech ventures, the ethics of communities of fate, and notions of biosovereignty.

#### EXCESS AND OPPORTUNITY

The “bios” in biopolitics in Asia is fraught with historical experiences of material abundance and backwardness, of susceptibilities to conquest, failures, and diseases. The elements of surplus and risk continue to haunt the ascendant megastates of China and India as they seek to grapple with double-digit growth and massive impoverished populations. In his book, *Biocapital*, Sunder Rajan stresses “surplus and symptom” to specify the place of surplus populations as experimental subjects in “*the imaginaries of the American free market*,” so that the desire for excess bodies is “*symptomatic*” of global power relations.<sup>70</sup> Capitalist development invests Asian bodies with an “uncanny surplus,” that is, as embodied commodities that promise, in Marx’s formulation, the generation of never-ending surplus value and limitless desires.<sup>71</sup>

Biotech modernization is not, however, characterized by unambiguous outcomes of certain profits; rather, it is shaped by strategies based on probabilities and probable outcomes. Not too long ago, the demographic surplus of giant Asian nations was considered a curse, a drain on material values. The Western view of China and India as burdened by a surfeit of population defined the image of developing economies—from Indonesia to India—as caught in a Malthusian trap. In the 1960s, the Club of Rome warned that both Asian giants would founder under the weight of their population and sink deeper into backwardness if they did not rigorously curb fertility rates. Such dire judgments from outside authorities put pressure on Chinese policy makers eager for science to help their catch-up race with the West. China’s uncritical embrace of high-tech science shaped a family planning policy that inflicted devastating results for the welfare of Chinese families and society at large.<sup>72</sup> Nevertheless, as market reforms took off on the basis of its vast pool of cheap labor, Chinese authorities continued to worry over the insufficiently high “quality” (*suzhi*) of its human resources,<sup>73</sup> and to promote extensive skills training from the agricultural to the highest scientific fields. Such regimes of biopolitical management cannot easily convert perceived demographic risks into human capital, but are in continual confrontation with uncertainty.

Over the past decade, Asian countries have developed new interest in the ideas of biosurplus and biosusceptibility as new realities, and a reflexive approach based on calculations of probable outcomes. The political appeal of biotechnologies and the biosciences lay in their promised though ambiguous outcomes for big nations. Gigantic populations are now viewed as a source of undervalued surplus as well as of new opportunities. Bioscience and biotechnologies have unlocked the hidden wealth of surplus humanity. Big populations articulate high-tech capitalism not only as a cheap labor pool or exploding consumer market,<sup>74</sup> but also as a biological source of wealth and sustainable growth.

From the vantage point of the state, biotechnologies also provide solutions to problems of human survival, living, and well-being that are delicately balanced between enormous opportunity and risk. Excess bodies are never only about presenting new opportunities for profit making, but are also openings for new political interventions that shape an economy of ideas and effects. The uncanniness of corporeal abundance is refracted through the specter of hunger and susceptibilities to crop failures and infectious diseases. But the very threats to populations create new opportunities for security interventions that continuously integrate new elements that may produce intended outcomes as well as new risks.

Bioinsecurity as a new political reality was created by political responses to recent epidemics—the AIDS/HIV virus, SARS, and avian flu—that threatened to derail booming Asian economies. These diseases originate and/or flourish in Asian ecosystems. Because migrating pathogens threaten the health and welfare of Asian populations and nations, a risk imaginary has fastened tightly on the necessity of the state in taking a big role in funding and promoting research in the life sciences. For decades, health professionals in Asia have noted limited Western interest and investments in “tropical diseases” such as malaria, dengue fever, and so on. In addition, the incompetence of authorities in handling the SARS epidemic, especially in China, exposed regional governments to their scientific unpreparedness when it came to collective health measures and biomedical sciences.

An implicit social contract of biosecurity has come to dominate public discourses as the burgeoning middle classes demand that healthy and safe bodies, not just growing paychecks, are achievable norms in Asia. The SARS epidemic, followed by the spread of avian flu and dengue

fever in the past decade, has intensified the production of security-conscious subjects, and generated new discourses of ethics of modern health protection in cities such as Shanghai and Singapore.<sup>75</sup> As scales of ethical reasoning have moved up from the material well-being of the individual to the well-being of the state, other events have stirred a sense of collective hyperinsecurity. Especially in Southeast Asia, the series of recent financial crises, tsunamis, and epidemics have increased demands for greater state action in solving the problems of population, profits, and national survival.<sup>76</sup>

Indeed, the feeling of biological insecurity is exacerbated by the Western view of the Asian region as a zone of infectious diseases menacing the rest of the world. Western countries view SARS and avian flu as Asian diseases spread throughout the world by Asian travelers. Journalists refer to Asian arrivals in Australia as walking incubators of a disease epidemic,<sup>77</sup> and Canadian health workers traced the spread of SARS in Canada to Asian tourists. The visceral links between SARS and Asian bodies thus ignited global perceptions about the risks that threaten Asian nations and their future. The external and internal association of bioinsecurity with Asian bodies and nations seems to index their qualitative difference, a material difference that attests both to their experience and to their innovative potential as biological subjects.

Especially in places with an ethnic Chinese majority, a seeming biogenomic connection between ethnicity and SARS has given the Chinese sense of exceptionalism a new materiality. Newspaper and other media reports mediate scientific research findings, disseminating a form of social knowledge about the biological susceptibility of ethnic Chinese populations across Asia. In 2003, a research team at the MacKay Memorial Hospital in Taipei claimed that Taiwanese and other Asians, “including people from China’s southern coast, Hong Kong, Singapore and part of Vietnam,” have a genetic variant in the immune system that make them more susceptible than Aboriginal groups or Caucasians and Africans to SARS infection. The scientists suggest that their findings “explain why south China was the epicenter of the SARS epidemic.”<sup>78</sup> The news was widely disseminated in Asia, producing a kind of panicked belief that “Asians” are more susceptible to an array of “Asian” tropical diseases, many of which have failed to garner sufficient research interest in the West. Asian states were pressured from within

and without to control the flows of pathogens and patients that seem especially lethal to peoples in the region.

SARS was thus identified as an “Asian disease” in search of an Asian answer. The specter of Asian genetic risks stirred public perception of the need for therapies and drug markets that cater specifically to the health needs of local populations. Doctors in Singapore note that Westerners have been the dominant beneficiaries of global pharmaceuticals, and that it is time for Asian scientists to undertake research on diseases that seem to disproportionately affect populations in tropical Asia. There is also the demand for drug dosages and treatments specifically tailored to Asian patients. The Asian “ownership” of certain diseases demands Asian state solutions. For instance, Singapore’s up-to-date blood storage was justified in part by the need among leukemia patients for Asian donors. Whatever the scientific bases of many of these claims, there is a growing perception of Asian health exceptionalism, of compelling reasons for the state to invest in biomedical research that address genetically inherited “Asian” diseases such as liver cancer, cancer of the lymph nodes, and nose and throat cancer. Indeed, hospitals in Hong Kong and Biopolis in Singapore are leaders in research on these diseases, as well as in developing vaccines for combating SARS and the avian flu.

By conjoining fears of mass hunger, epidemics, and economic derailments, Asian governments are redefining the contours of security. The series of health crises and perception of Asian vulnerabilities create fresh conditions that legitimize government interventions and investments in the life sciences. Hyperbiosecurity becomes the new normal, instituting necessary expertise and practices that can secure and map Asian futures. Indeed, one can say that sovereignty gains a new legitimacy in its paternalistic role, which makes a vital new connection between neoliberal logic and biotechnological expertise that can, it is hoped, protect their peoples and move Asian nations to the frontlines of global sciences.

Two chapters in this volume focus on Asian megastates, exploring how the coupling of biotechnologies and surplus populations at this historical moment shape both opportunity and risk for capital accumulation and national security. In India, the interplay of surplus and symptoms is increasingly orchestrated by state-driven interventions to technologize living labor. Sunder Rajan observes that an abundance of

poor Indians has made the state desirous to “biocapitalize” its own citizens by making them available as experimental subjects of clinical trials. This is an effort to “brand” India as an ideal site for global drug testing in the context of a broader historical transition from manufacturing to speculative capitalism. The chapter investigates what (and who) becomes bioavailable to, or gets consumed by, the experimental machinery of global biocapital.

In Nancy Chen’s chapter, the dynamic of population abundance and vulnerabilities is examined in the area of genetically modified food production. She notes that China’s “drive toward developing new products and planting genetically modified (GM) crops” to feed a gigantic population is backlit by the recent history of crop failures and famines. Her chapter traces “the different trajectories of genetically modified rice and soy in China,” and their promotion as key crops for the maintenance of national food security. The pragmatic and rapid propagation of GM foods is considered the moral obligation of the nation, an exercise of its sovereign economic and scientific capacities, finally, to ensure the survival of the masses. Thus despite pollution and displacement of older seed lines, there is barely any criticism, in sharp contrast to the debates one hears in Europe and America about the dangers of “Frankenfoods.”

#### BIOVENTURES

Like the modernization of science in America, biotechnical innovation in Asia is a strategic political project; Asian innovations, however, have been initiated not in response to the space race but in an age of neoliberal risk calculations that anticipates infinite numbers of threats to governance and national emergence. More fundamental, unlike in North America, Asian state valorization of the sciences—from genomics to nuclear weaponry to space exploration—recreates, rather than undermines, authoritarian state power. Furthermore, the East Asia state tends to be a powerful arbiter of scientific meanings that mold how people think about themselves as ethical beings and citizens. It is the state, rather than private enterprises, that creates the moral instruction and material field for making policies for building bioeconomies.

Biotechnologies are innovations in Asian capitalism, the latest in a series of state-directed programs to create high-tech zones. Since

the 1970s, China, Thailand, South Korea, India, Taiwan, and Singapore have sought to upgrade beyond the category of low-wage export economies to the rank of “knowledge economies” that will allow them to leapfrog ahead, as a World Bank report recommends.<sup>79</sup> Through the 1980s and 1990s, a high-tech corridor modeled on Silicon Valley emerged across Asia, from Seoul to Malaysia’s Multimedia Super Corridor and India’s cybercenters. These high-tech nodes are interlinked sites that assemble disparate knowledge actors and institutions to form “ecologies of expertise.”<sup>80</sup>

At the turn of the century, neoliberal visions of Asian scientific futures spurred a biotech building spree. While many Europeans remain skeptical about focusing on the “knowledge-based bioeconomy” as a “driver of growth and competitiveness,”<sup>81</sup> in East Asia, there seems to be little doubt about the primacy of science in global competition. Biotech hubs have sprung up, sometimes alongside cyber and manufacturing centers, as the latest kind of special enclave for producing global values. I have argued that a neoliberal logic for administering space and population relies on zoning technologies to spatialize a graduated form of rule.<sup>82</sup> Science parks are well furnished with institutes, laboratories, and clinics, but they also provide special environments where social conditions foster appropriate self-enterprising conduct among the highly educated in order to link up with global markets. The state not only injects funds for cutting-edge research but also pays attention to working and living arrangements for scientists and their families. The hope is that such scientific havens may help stimulate creative work and speed up the conversion of ideas into new products.

The politics of zoning and unequal investments in national spaces reinforce existing inequalities as populations outside zones of exception, by that spatial fact alone, have limited access to state resources. In industrializing but still agrarian countries such as China and India, a string of high-tech nodes connected to global activities are practically disconnected from vast populations whose most fundamental needs have not yet been properly met. At the other extreme, there are Japan and Singapore, mainly middle-class societies where people have access to health, education, and scientific benefits, if to differing degrees.

The growth of knowledge hubs builds upon the rapid expansion of Asia’s educated elite. In East Asia, there is little or no questioning of the political necessity for improving “human resources” through invest-

ments in science education and institutions. One index of a relentless development of human capital is the performance of students from different Asian countries in international test scores in the fields of science and mathematics. There is a regional competition in upgrading universities to “world-class status,” with Singapore mobilizing global knowledge through strategic partnerships with American universities and scientific research institutions to form a “global schoolhouse.”<sup>83</sup> Joint programs between Western universities and institutions from China to Singapore and Indonesia have forged many connections in engineering, medicine, and public health. Currently, hundreds of thousands of engineers and scientists join the labor markets in China and India each year, and many of them spill overseas in search of further education or jobs. Even in smaller countries such as Thailand, medical institutions produce a significant number of doctors each year to sustain a rise in sophisticated medical skills. Foreign and local scientists gathered in Asian high-tech citadels foster values associated with a fearless scientific attitude toward modernity.

The return of foreign-trained Asian experts is crucial for the rapid growth of bioeconomies. With a decade-long rate of double-digit growth, Asian countries are luring back many students educated in the United States, Europe, and Australia. The turn of the century witnessed one of the largest repatriations of global skills in recent times. Since the 1980s, over 200,000 Chinese students trained abroad, mainly in the sciences, have returned to China.<sup>84</sup> The significant return of the Asian scientific diaspora—especially Indians, Chinese, and South Koreans—has led to the projection that by 2010, 90 percent of all Ph.D.-holding scientists and engineers will be living in Asia. This embarrassment of scientific riches contributes to “Asia’s great science experiment.”<sup>85</sup>

Asian bioeconomies tend to move in two directions. One system is focused on establishing Asian sites as world-class research hubs; this ambition is best represented by South Korea and Singapore. The other type of project is focused on providing biotech and biomedical services to global companies and international patients. These two biotech trajectories can and do overlap in some sites, but there is a ranking of priorities that is discernable across nations, mainly in relation to the degree of state involvement. Two chapters in this book show this contrast in types of bioeconomic function.

Charis Thompson draws on ethnographic research in Singapore and South Korea as part of a broader investigation into global patterns of stem cell research. She argues that there is a tendency to think of science as being everywhere and nowhere all at once, and always of the present; yet anthropologists, sociologists, and science studies scholars have shown that there are profound regional and local differences in how “the same science” is enabled, practiced, and understood. In this spirit, her chapter compares and contrasts characteristic stem cell research and regenerative medicine facilities in these two Asian sites. The axes of comparison include a focus on differences between characteristic facilities; scientific strategies, specializations, and hoped for pay-offs; the use of humans and animals; economic investment and rationales; and nationalist imaginaries. In sum, Thompson explores the question of what each nation’s investment in this part of the biotech revolution tells us about the nation and region in question, as well as what these nation’s engagements with regenerative medicine adds to our understanding of biotechnology and its significance.

In places where the state has not yet emerged as an initiator of biotech enterprises, private investments tend to focus on generating “low-cost, good-quality care” by health workers. Ara Wilson describes the rise of the Thai biomedical industry as a private-based assemblage that builds on earlier public projects of national development and security. Thailand’s emergence as a center for corrective surgery has roots in the growth of personal services for U.S. troops and medical training by the U.S. military during the Indochina wars. Private medical companies led the way in making Bangkok an international site for cosmetic surgery, fertility treatment, and other forms of health care. For thousands of foreign patients, the high quality of Thai medical services includes the “affective labor” of Thai nurses and attendants, who excel at plying patients with care and comfort. Recent biopolitical and economic challenges have prompted the Thai state to collaborate with medical corporations in order to position Bangkok as the mecca of medical tourism.

In India, where biotech endeavors tend to be exclusively private enterprises, doctors working directly or indirectly for overseas corporations can be recruited as on-the-ground agents for overseas pharmaceutical interests. Many drug corporations, Stefan Ecks observes in his essay in this volume, are making claims to “global corporate

citizenship” that aims to promote universal rights within corporate boundaries and beyond. For pharmaceutical companies, global corporate citizenship entails a promise to ease access to medications for all patients and to spread “health literacy” around the world—including Asia. Drawing on fieldwork in Kolkata (Calcutta), Ecks considers how corporate norms are translated to Indian doctors. Official and unofficial messages conveyed in a “depression awareness workshop” that he attended indicate that global norms are adapted to doctors’ notions of Indian citizenship. Referring to Foucault’s formulation of neoliberalism, Ecks proposes that global corporate citizenship is a form of “near-liberalism” that is not practiced uniformly across the globe, but permits switching into modes of conduct that create the opposite of consumer consciousness in the Indian context.

#### COMMUNITIES OF FATE

As I mentioned earlier, the ethics-as-moral-criticism approach presupposes a clear-cut division between bad guys (biotech entities and scientists) and good guys (“victims,” as they tend to be characterized by impassioned anthropologists). While speaking truth to power is laudable, more sensitive analyses of ethical practices will show that in each ethnographic case, the question of “who gains, who loses” cannot be answered in advance. An anthropology that “stays close to practices”<sup>86</sup> stays close to the politics and pathos of how people meet challenges and resolve problems within given conditions of possibility. The nexus between biotech techniques and moral reasoning is highly variable and dynamic, and complex ethical negotiations take place in an assemblage of conflicting logics.

Some anthropologists and feminists have long argued for attention beyond abstract formulations of ethics to the moral conduct in everyday social interaction and exchange. Arthur Kleinman insists upon “relational ethics” as the grounding of responsibility and trust in the clinic encounter.<sup>87</sup> “Feminist ethics” also identify social relationships as the space for the generation of moral reasoning, choices, and self-image.<sup>88</sup> But implicit in these approaches is an assumption that a set of given principles or norms must be operative in the ethical practice of ethnographic interactions.

An anthropology of “situated ethics” therefore reaches not for ultimately universal philosophical treatments of practices, but situates

ethical processes in specific milieus of politics, culture, and decision making. “Situated ethics” rejects the common assumption that moral reasoning can be simply determined by class location, or reduced to the scale of the isolated individual. In matters of biotechnology, biomedicine, and biosecurity, it is more fruitful to locate moral reasoning at the intersection of overlapping scales of risk and ethics.

For instance, biovalue and biomedical inventions are not necessarily or everywhere viewed as contrary to ethics. Ethical claims interact with degrees of risks in any context. It is the space between individual, family, professional, community, and national scales where new ethical possibilities and decisions emerge. For instance, the ethics of health self-management may articulate claims on the state to provide for the collective well-being. This situated and dynamic understanding of ethical reasoning means that outcomes cannot be noted in advance, and that tensions among divergent ethical demands engender complex solutions.

Bioethics debates in the West pivot on innovative biomedical techniques that put into question moral concerns about abortion, organs transplant, and stem cell research and genetic therapy.<sup>89</sup> Whereas a major focus of the bioethics debate in North America and Europe has been on individual rights and informed consent, one cannot deny that voluntary action by patients and donors tend also to be colored by the emotionally charged issues of regenerative benefits for the family, and even the community and nation.

In Asian milieus, such issues tend to be subsumed under an overriding ethical interest in the biosciences as a technology that promises to bring bioprotection and biosecurity to patients, citizens, and nations. So while biomedical enterprises are legally required to enforce bioethics, clinical and research guidelines are only the beginning of larger ethical implications of biotech innovations. Politicians, top scientists, and the media invariably link such scientific procedures to ethical concerns about collective well-being and national advancement. Indeed, the embrace of bioscience and biomedical policies has produced a new idiom of ethics that is bringing to life communities of shared corporeal needs and vulnerabilities. Biotech and biomedical procedures thus trigger emotional maps of belonging and collective fate, enhancing an awareness of the scientific and raising the security stakes of being modern Asian subjects.<sup>90</sup>

The spread of biomedical knowledges and practices among professionals and consumers is accompanied by the inculcation of values of bioresponsibility. The ethicalization of biomedical practices intersects with neoliberal ideas about individual capacity for self-improvement through material and scientific means, that is, by enhancing “biological capital,” including at the genetic level.<sup>91</sup> Whether through “educated” choices as drug consumers, or readiness to donate blood or organs, people are induced to shape new ethical selves as biomedically informed subjects. But individual biomedical decision making and choices are ethically framed in relation to what is good for collective living.

Especially in South Korea, Singapore, and Japan, the state intervenes in a variety of ways to establish the apparatus of biosecurity, especially in the areas of tissue banking, regenerative medicines, and genetics research that respond to citizens’ needs. This state emphasis on biosecurity measures has a cascading effect in the popularization of biomedical knowledge. Preexisting norms of ethnic consciousness and civic virtue intersect with the emerging ethics and necessity of biomedical knowledge. Pharmacogenomics popularizes a new biomedical consciousness about ethnic and racial difference, further reinforcing the necessity of biotech innovations for securing the future of communities. For instance, the use of social categories of racial/ethnic groups to frame studies of certain diseases, or the variation among groups in the metabolism of drugs, seems to make operative folk beliefs in genetic transmission, predisposition, and “risks” for certain diseases. Even well-educated politicians, medical practitioners, and scientists believe in some degree of genetic determination in relation to birth defects and mental capacities. Ethnic profiling in regenerative medicine has influenced biomedical citizen-subjects to embrace the normality of tissue donation for the good of the ethnic group, the nation, and even Asian peoples in general. This pharmacogenetic consciousness enhances the ethical embrace of “smart medicine” by the elite to protect the self, the family, and beyond. Such ethical reasoning about the value of scientific techniques becomes somewhat aligned with state interests in optimizing a vitalist order for society at large. Biomedical decisions thus take place at the intersection of many ethical scales, as contemporary science directly and indirectly poses the question, What is the value of Asian lives today?

Regenerative medicine is an area where situated ethics can overshadow universal principles of bioethics. For instance, the scandal surrounding Hwang Woo-Suk's false claim to have cloned a human embryo reveals complex ethical reasoning by egg donors. To Western critics, the research fraud was preceded by other questionable practices. In 2004, Dr. Hwang used close to 250 embryos in his cloning attempts, and it was later revealed that through an intermediary, women—among them his junior scientists—were compensated for donating eggs for the project.<sup>92</sup> Western observers claim that “a culture of secrecy and deference” gave Hwang influence to thwart ethical oversight in his lab.<sup>93</sup> Hwang was indeed celebrated as a science hero in South Korea, but while there was admission of ethical “flexibility” that allowed Hwang's project to outrace government regulations, the bioethical situation is more complex than poor lab governance. What needs to be emphasized is that the female donors acted in a voluntary capacity, less for money than in support of the Korean stem cell project. Indeed, it was later reported that Hwang had discouraged voluntary offers of eggs by his researchers, but one of them represented her voluntary act as one of historical duty: “It was an act of sacrifice. In the annals of scientific advancements, you can find again and again cases of scientists sacrificing their own bodies, using their own bodies for their experiments. When you face a new challenge, you sometimes have to leap over the ethical boundaries. Only history will judge the deed.”<sup>94</sup> Following the international humiliation of Hwang, feminists and civic groups criticized Hwang's actions for hurting “national interests,” but more women came forward to donate their eggs. One cited the Korean stem cell projects as their “only hope” for treating diseases such as spinal cord injuries. Thus, voluntary decisions to donate organs for research jump many ethical scales, linking the ethics of medical sacrifice to the ethics of national scientific achievement.

The nexus of multiple ethical decisions in the Hwang case challenges a simple argument for “the cultural constitution of bioethics.”<sup>95</sup> Margaret Lock observes, for instance, that in Japan a diagnosis of brain death is made regularly in ICUs but the state of brain death is not equated with the end of human life, thus making the harvesting of transplant organs ethically problematic in that country.<sup>96</sup> Growing public pressure for the availability of high-quality organs, however, may lead to the acceptance of brain death as the cessation of life. As

I have noted above, cultural values are in a dynamic relationship to politics and in Asian contexts are frequently articulated with evolving national interests. For instance, in contrast to Westerners' skepticism over customized medicine, elite Asian populations welcome tailored medicines and the scientific imprimatur they give to popular beliefs that there is a genetic basis to social identities. Furthermore, there is an overwhelming sense that diseases prevalent in the region have not been given their due by medical research based in the West. Asian countries are now ready to reject Western one-size-fits-all models, and to conduct scientific study of genetic variants among Asian populations.

In Singapore, genomic institutes have created a stir because they promise the discovery of treatments tailored to diseases of different Asian groups, for example, early-onset breast cancer, nasopharyngeal carcinoma, and hepatitis B–linked liver cancers among ethnic Chinese; heart disease and cancer of the oral cavity among Indians; and diabetes among urban Malays. Bioethics is thus invariably linked to the protection not only of the individual patient, but of the entire ethnic community, a cultural collectivity now deeply embedded in the same genetic game of chance and fate. Scientific “facts” shape voluntary decisions in self-care and care of the family, folk notions are inveigled into clinical categories, and molecular techniques intended to undermine phenotypic differences cast in ethnic, racial, and national terms now resuscitate them. Consequently, bioethics goes beyond legal rights to stir powerful emotional bonds of distinctive biological essence and fate.

Three essays in this book explore situated ethics-making practices that legitimize or foster biotech procedures in relation to overlapping communities of fate. In China, links between private and state storage of blood are haunted by issues of sovereignty and notions of blood as a collective resource. Drawing on ethnographic research in Shanghai, Vincanne Adams, Kathleen Erwin, and Phuoc V. Le argue that the problem of “blood donation” in urban China illuminates the ways in which governance occurs in and through the management of bodies, tissues, and fluids. Unlike blood donation in other regions of the world, blood donation in China is tied to a variety of perceptions concerning blood as a vital bodily essence; obligations to family, work unit, and the larger society; and, finally, society's obligation to the donor. They claim the emergence of a regime of not “biopolitics” but rather “politico-

biology,” which politically constitutes fundamental ethical ideas about the body, and enables exchanges between individuals and institutions.

Transformations in the value of blood, I argue in the essay “Life-lines: The Ethics of Blood Banking for Family and Beyond,” are produced by a novel configuration of biotech, ethical, and aesthetic elements in Singapore. Drawing links among official tissue networks, private banking of cord blood, the promissory marketing of blood banks, and Zhang Xiaogang’s “Bloodlines” paintings, I track the revaluation of blood substances at multiple scales. Official storage of human tissues is legitimized in terms of securing citizens’ future needs, part of a broader regime of biomedical citizenship. Meanwhile, commercial claims about the value of stem cells also prompt couples to bank the cord blood of their infants, a procedure that has become a performance of ethical parenting. The unwitting biomedical resuscitation of folk beliefs in fixed ethnic essences, also figured in contemporary Chinese art, led to projections of diasporic yearnings for reconnecting with ancestral, mainland China.

In Japan, the public discussion on human stem cell research is sensitive and treated with great political care. In her essay in this volume, Margaret Sleeboom-Faulkner argues that it is not stakeholders who carry the discussion on human stem cell research, but the academic, scientific, and political interest groups that support, (mis-)quote, and hijack the voices of dissenting minorities. She shows how these interest groups capitalize on their envisaged future of such research. Her argument entails an account of how past experiences are linked to stated promises, perceived risks, and doubts about recent changes in views on human stem cell research, as they link to current trends in stem cell research. In Japan, it seems, stem cell research must continue unimpeded for the good of Japanese science and the population at large.

### *The Rise of Biosovereignty?*

The age of genomics has had the paradoxical effects of circulating economies of knowledge, on the one hand, and reinforcing nationalist goals, on the other. While the neoliberal logic of Asian states has been to make their economies more fluid, it has also enabled sovereign powers to stand up to global institutions. When anthropologists have touched on the connection between biotechnologies and sovereign power, their focus has been on the powers of drug companies and

commercial rivalry. Cori Hayden, in a study of Mexico, has argued that increased activities of bioprospecting are creating new modes of inclusion and exclusion; communities are constituted either as sites for the harvesting of bioresources, or because of their potential for pharmaceutical profit making.<sup>97</sup> Paul Rabinow, in his study of a transatlantic project on the genetic basis of diabetes, ends with an account of how the French state broke with American partners for fear of theft and profit from the use of “French DNA.”<sup>98</sup> Gisli Paulson and Rabinow, writing about European biotech milieus, note the “different forms of collaborations between the state, the academy and the private sector” that exist there.<sup>99</sup>

The biotech contexts in Asia also involve a range of public-private collaborations, but the nation-capital-genomics triangulation is differently weighted in terms of national development or biosovereignty. Some states forge a complicated relationship with global capital and Big Pharma, inviting partnerships but also promoting the development of the national economy. Furthermore, countries such as Indonesia and China recognize their wealth in biodiversity and attempt to corral and define their nation’s biological resources as state property.

Tensions between property rights and sovereign rights are handled differently across Asia. In tiny Singapore, the state depends on alliances with corporations and research institutions. A strict adherence to the private property rights regime established by TRIPS (Trade-Related Aspects of Intellectual Property Rights) and the World Intellectual Property Organization attracts global corporations eager to protect patents and profits.<sup>100</sup> However, where government-funded agencies are involved in partnerships with foreign firms, there are contracts that split proprietary rights and profits. Countries with more natural resources seek greater control of their links with Big Pharma, especially in order to protect home-grown biomedical industries. The issue of “compulsory licensing” has become very prominent in Thailand and India lately. This process allows for opening borders for trade and securing multinational copyrights, on the one hand, and reaffirmations of national rights to allow generic production of life-saving drugs “in case of emergency,” on the other. India has produced a lucrative market of generic drugs for the global South. For the Indian government, TRIPS and similar issues are usually framed in terms of rich/poor, developing/developed countries, and less in terms of national security as such.<sup>101</sup> Thailand, of

course, is seeking to control its highly competitive medical tourism industry.

Other states are even more assertive vis-à-vis the pharmaceutical industry, and are formulating policies that lock in the potential values that can be generated from nature through scientific research. I identify “biosovereignty” as an emerging set of thinking and practices through which the state protects and leverages bioresources by placing constraints on the free market forces. Asian sovereign powers increasingly govern the distribution, uses, and compensations of bioresources that “belong” to Asian countries.<sup>102</sup> Biosovereign practices include a new political assertiveness in dealing with global biotech research and global Pharma, which are otherwise dominated by Western interests.

Indonesia, a latecomer to the world of modern biotechnology, expresses a form of biosovereignty that challenges the global commodification of health. In 2006, the avian flu (H5N1) crisis led Indonesia to assert political exception to the global intellectual property regime. As the country with the largest number of avian flu victims, Indonesia’s health minister Siti Fadilah Supari was quoted as saying “We cannot share [virus] samples for free. There should be rules of the game for it.”<sup>103</sup> In the face of international criticism, the Indonesian state invoked a national health law that requires an agreement prior to transferring virus samples and their limited use for diagnostic purposes. This act of biosovereign leveraging challenges the intellectual property rights of drug companies to access virus materials stored by the World Health Organization (WHO). After a period of standoff, in February 2007, Indonesia and other Southeast Asian countries pressured WHO to adopt a new mechanism on sharing viral samples and require drug companies to compensate donor countries. A Thai health official observes that nations “at the epicenter of the pandemic” should tie their transfer of H5N1 samples to “assured access to potential pandemic flu vaccines.”<sup>104</sup> Indonesia’s flexing of biosovereignty muscle resulted in a deal with Baxter International that in exchange for virus samples the corporation would help the country to produce and market bird flu vaccine. The avian flu incident crystallized conditions for the assertion of biosovereignty and the rise of a regional alliance to regulate the commercial use of health samples.

Another exercise of biosovereignty targets the flows and uses of genetic materials perceived to be distinctive to a given ethnicity, race,

or nation. Cultural origins and migration stories are becoming the prior grounds for genetic mapping of peoples and nations. Genomic sciences allow for the framing of patrimony for political and economic interests, thus bolstering the stakes for nationalist pride and security interest. In China, there is increasing bioparanoia over the unauthorized use or suspected piracy of Chinese health data by foreign, non-Chinese researchers. In one heated case, Chinese scientists labeled American access to Chinese DNA materials as “the gene war of the century,” that is, the theft of genetic patrimony disguised as scientific research.<sup>105</sup> In 1999, a Chinese law banned the export of DNA materials, and India soon followed with a similar ban.

China’s image as a source of plentiful human eggs and embryos, on the one hand, and of experimental bodies, on the other, has prompted the state to more rigorously limit or channel international scientific collaborations. Beijing has a special body that authorizes international sharing of health data and tissues. Unlike India, Beijing is very slow in approving applications by global drug companies and their services to conduct clinical trials in China. Increasingly, its search for international scientific expertise is oriented toward collaborations with other Asian nations. An implicit norm of ethnic trust seems to underpin approvals for joint research projects, many of which are with overseas Chinese experts. At Singapore’s universities and hospitals, more scientists are partnering with mainland Chinese clinicians in projects that range from analyzing PRC biomedical data to joint research on new therapies affecting Asian populations. In short, different forms of biotechnology are being used as tools for the management of collective national interests, reviving historical beliefs about national essences and opening up a new vital area for manifesting biosovereignty. For instance, the new genomics is being wielded for expressing nationalism and its territoriality in startling new ways.

Jennifer Liu, in her essay in this volume, investigates a biomedical laboratory project where discourses of ethnic purity and hybridity interact with notions about stem cells with uniquely “Taiwanese genetic characteristics.” She maintains that these scientists seek and claim a singular truth about Taiwanese identity even though there is the recognition of population diversity and hybridity. For the researchers, stem cell research promises the hope of “pure” self-renewal in the form of autologous stem cell therapies. In discursive and laboratory spaces,

ideas about purity become increasingly polyvalent, and are mobilized in new ways in making both identities and stem cells.

In the final chapter, Wen-ching Sung examines how the rise of genomics has helped substantiate the notion of “Chinese DNA,” a new public imagination about nation-building in China. The notion of Chinese DNA assumes that Chinese peoples share similar biological features, which can be pinned down at a molecular level. It is a bio-cultural-geographical cluster that is entangled with China’s century-long discourse and practice on race, ethnicity, and nationality. For Sung, the search for a Chinese DNA epitomizes the emergence of a certain “bionation” concept influential in contemporary statecraft. On the one hand, “bionation” connotes the politics of similarity, which claims that China is a unified nation because its many ethnic groups have common blood, ancestry, and genetic makeup. This narrative of “unity of diversity” shapes the Chinese notion of sovereignty and the nation’s attitude toward Taiwan and Tibet. On the other hand, “bionation” identifies a mode of biopower in late capitalism that views ethnic communities as a storehouse of genetic materials to be defended and turned into products for the good of all citizens. This interplay of notions of Chinese DNA and bionation is a significant dynamic that recombines disparate cultural, political, and economic elements around emerging biotechnologies.

There are thus different orders of incipient Asian biosovereignty, and while sovereign logic actively engages biocapitalist flows, it is beginning to constrain the full exercise of global corporate powers and multilateral agencies. State biostrategies have become more pronounced in the Asian contexts of health epidemics, drug market competition, and the political ethics of collective fate. The dueling projects being undertaken in China and Taiwan on Chinese DNA show that scientific technologies cannot be pried loose from the political matrix of framing, socio-cultural obsessions, and ethics within which they are embedded and deployed. There is by no means a uniform embrace of biosovereignty, and its mapping is highly uneven and responsive to events and fluidity in the valuation and politics of bioresources.

*Asian Biotech* is the first study to provide on-the-ground studies of emerging biotech milieus across Asia, from India to Japan. This col-

lection explores the political and ethical implications of biotechnologies outside contexts of Western advanced liberalism. Asia is a region of political and ethical contradictions, of population surplus and bioinsecurity, of economic backwardness and full-throttle capitalism, of memories of colonial humiliations and the cumulative force of resurgent nationalism. The life sciences, and biotechnology in particular, are becoming tools of biopolitical security and ethical claims for integrating heterogeneous peoples in ambitious nation-states. Despite sharp differences between China and India in their biotech projects, this is a transcendental moment in Asian scientific experimentation. Significant conceptual implications of Asian biotech have theoretical applications well beyond the region.

First, this collection challenges the view that the rationalities of market and science are incompatible with the “irrationalities” of feeling and identity. Rather, the proliferation of biotechnologies opens up a new question of what objects should be acted upon in the name of Asian security. Recent experiences of epidemics and the promise of biotechnologies have given a new materiality and ethical configuration to contemporary Asian exceptionalism. The chapters that follow track different vectors of biotech sciences and how they have been crucial to the regeneration of bodies, communities, and nations, giving “life” new ethical meanings at shifting scales from single nucleotide polymorphisms to ecosystems. Situated and multiscale convergences of biotechnology, politics, and ethics are involved in constructing possible communities of fate.

Second, the following chapters trace a dynamic interplay between scientific and cultural categories for shaping modern life and living that run contrary to binary nature-culture frameworks. As biotechnologies travel, specific techniques are recombined with situated cultural notions, ethical concerns, and political goals. Instead of scientific knowledge erasing social beliefs, folk categories can be applied to biomedical procedures, thus reinforcing social understanding of ethnic and racial differences. Genomic and social codes can overlap in political attempts to configure biosovereignty and deflect the incursions of global corporations.

Third, ethnographic investigations reveal that moral reasoning takes place in the midst of interacting risk calculations and ethical regimes. Scholarship on bioethics should for that reason move beyond a singular

focus on individual rights, or at most, on the rights of only indigenous populations. By contrast, a situated ethics approach pays attention to actual decision-making practices at the intersection of ethical scales that can include kinship, culture, ethnicity, and the nation. Moreover, in some Asian contexts, political and individual decisions about the life sciences and biomedical innovations tend to cast biotech enterprises as a form of ethical capitalism, that is, regulated commercialized science that benefits the nation.

Fourth, the relationships among state, biotechnology, and Big Pharma vary, and non-Western contexts are not always defenseless against global science and predatory drug companies. Different biotech centers are shaping new ethical grounds for asserting state proprietorship over nature and defending against biocapitalism. At the transnational level, the SNPs consortium strengthens individual government's capacity to build their own genomic databanks and thus fend off global corporations that would otherwise freely corral living materials for commercial use.

Finally, the Asian biotech assemblages discussed in the book are contingent arrangements, vulnerable to political upsets, market meltdowns, or environmental crises. While these clusters are permutations of biotechnologies and sovereign politics, it remains uncertain whether all peoples can be drawn into the biopolitics of security. Reenvisionings of biocommunities of fate implicitly follow ethnic, majority-minority, and national lines. We can expect that unequal and uneven access to biomedical innovations will increase, and be further exacerbated by investments in biomappings of ethnic differences. Such biocollectivist claims become vulnerable to challenges from marginalized and excluded peoples as well as from individualistic claims of the burgeoning middle classes. As the life sciences open up a new world of possibilities, growing public debates about their intended and unintended outcomes will probably follow.

It is not clear if the ethicalization of biotechnologies at multiple scales implies a historical rupture in Asia's treatment of nature and biovalue, forecasting a more ethical approach to collective living systems, or whether the ethos of neoliberal self-care will undermine or unravel ethical integration. Furthermore, besides intrastate tensions between divergent ethical demands, there are also international tensions as Asian nations race to take scientific command of their nation

and global influence. The biotech constellations presented in this book are based on probability calculations of economic and political outcomes that cannot be guaranteed in advance. Nevertheless, world forums should sit up and take note that the generation and crafting of genetic data are no longer a monopoly of pharmaceutical companies, nor is ethics interacting with biotechnologies only framed by Western cultural norms. Asian nations are emerging players in biogenomics and key architects of an alternative realm of biotech culture.

### Notes

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2. Richard Black, “Singapore High-tech Heaven Opens,” BBC News, October 29, 2003, <http://news.bbc.co.uk/2/hi/world/asia-pacific/3223393.stm>. See also Edison Liu, “Asia’s Biotech Tiger,” *New Scientist* 175, no. 2360 (September 14, 2002): 54–57; and “Singapore: The Biopolis of Asia,” *Science*, April–May 2003, D1.
3. David Cyranoski, “Chinese Bioscience: The Sequence Factory.” *Naturenews* online edition, March 3, 2010, <http://www.nature.com/news/2010/100303/full/464022a.html>.
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6. See Martin Fackler, “Scientist at Work: Shinya Tamanaka. Risk Taking Is in His Genes,” *New York Times*, December 11, 2007, Science section, 1, 4.
7. For the concept of “global assemblages,” see Stephen J. Collier and Aihwa Ong, “Global Assemblages, Anthropological Problems,” in *Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems*, ed. Aihwa Ong and Stephen J. Collier (Malden, Mass.: Blackwell, 2005).
8. *The American Heritage Science Dictionary* (New York: Houghton Mifflin, 2002).
9. Michael M. J. Fischer, “Four Genealogies for a Recombinant Anthropology of Science and Technology,” *Cultural Anthropology* 22, no. 4 (November 2007): 573.
10. We use the term “the West” as a “native” category deployed in many Asian contexts to refer to the political and economic cluster of nations led by the United States and the European Union bloc, including Australia, New

Zealand, and occasionally, contingently, Japan, that are an imaginary geography of political domination and exemplary standard bearer of global science. Of course the emergence of “BIC”—Brazil, India, and China (sometimes Russia is included in “BRIC”)—as a constellation of global power sites is another imaginary space for launching efforts to “catch up.”

11. A popular example of the view is captured in Francis Fukuyama, *Our Post-human Future: Consequences of the Biotechnology Revolution* (New York: Farrar, Straus, and Giroux, 2002).
12. Donna Haraway, “A Cyborg Manifesto,” in *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 8–10, 152.
13. Michio Morishima, *Why Has Japan “Succeeded”: Western Technology and the Japanese Ethos* (Cambridge: Cambridge University Press, 1984).
14. China’s rise has realigned Asian states around its market, investments, and cultural influence. A formalization of the regional trade arrangement is ASEAN+3, or the Association of Southeast Asian Nations and China, South Korea, and Japan as an emerging economic bloc.
15. Starting in the eighteenth century, Chinese intellectuals such as Fen Guifen debated how to combine cultural essence and modern techniques (or *ti-yong*) so that wealth and power could be achieved through Western technology without eroding the foundation of Chinese civilization. See J. Mason Gentzler, *Changing China* (New York, Praeger Publishers, 1977), 70–71.
16. See Aihwa Ong, “Assembling around SARS: Technology, Body Heat, and Political Fever in Risk Society,” in *Ulrich Beck: Kosmopolitisches Projekt*, ed. Angelika Pferl and Natan Szaider (Baden-Baden: Nomos Verlagsgesellschaft, 2004).
17. Harriet A. Washington, *Medical Apartheid: The Dark History of Medical Experimentation on Black Americans from Colonial Times to the Present* (New York: Random House, 2008).
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22. *Ibid.*, 31–32.
23. Kaushik Sunder Rajan, *Biocapital: The Constitution of Postgenomic Life* (Durham: Duke University Press, 2006), 7.
24. Waldby and Mitchell, *Tissue Economies*, 31–32, 185.
25. Rajan, *Biocapital*, 78–79.

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29. Rhonda L. Rundle, “A Daisy Chain of Kidney Donations,” *Wall Street Journal*, September 23, 2008, D1, D2.
30. Paul Rabinow and Nikolas Rose, “Thoughts on the Concept of Biopower Today,” *BioSocieties* 1 (2006): 195–217.
31. Nikolas Rose and Carlos Novas, “Biological Citizenship,” in Ong and Collier, *Global Assemblages*, 445.
32. Nikolas Rose, *The Politics of Life Itself* (Princeton, N.J.: Princeton University Press, 2007), 3–4.
33. Michel Foucault, *Security, Territory, Population: Lectures at the Collège de France, 1977–1978*, ed. Michel Senellart, English series ed. Arnold I. Davidson, trans. Graham Burchell (New York: Palgrave Macmillan, 2007), 109.
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35. Mitchell Dean, *Governing Societies* (Maidenhead, U.K.: Open University Press, 2007), 11.
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40. *Ibid.*, 246.
41. Foucault, *Security, Territory, Population*, 2, 11.
42. *Ibid.*, 109.
43. *Ibid.*, 352.
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In March 2006, at Sotheby's New York salesroom, a Singaporean collector unfamiliar to Asian art dealers paid nearly one million dollars for the painting of a dazed-looking Chinese man. The painting brought the highest price at New York's first auction of Asian contemporary art. Much of the art sold was politically charged, referring to Mao Zedong, Tiananmen, and consumer culture.

But the painting in question seems decidedly apolitical, part of the "Bloodline Series" of portraits by the Chinese painter Zhang Xiaogang. Zhang has since become one of the most sought-after contemporary Chinese artists in global art markets, and his works are shown by the gallery PaceWildenstein in New York City (which opened a branch gallery, Pace Beijing, in China in 2008).

Like other pictures in the "Bloodline Series," *Comrade no. 120* is based on passport shots; but, projected as they are onto large canvases, each one takes on the monumental aspect of Chinese ancestor portraits. American art critics frequently note the blank expressions and stiff formality of Zhang's figures, many of them clad in proletarian fatigues, as an indication (indictment) of the oppressive degree of uniformity imposed by Mao's authoritarian regime. A description in the Sotheby's catalogue notes, as the "eyes of the sitters stare out at us like glistening black pearls, there is a tangible sense of catharsis for the suffering they have endured."<sup>1</sup> Such well-intentioned misreadings rob the authority of the paintings and undercut their intended messages. To me, Zhang's paintings seem to capture the fleeting moments of remembering and forgetting in the turbulent family histories of modern China. Zhang has said of his "Big Family Series," which seem in-



**Figure 1** “Bloodline Series”: *Comrade No. 120*, by Zhang Xiaogang (1988). COURTESY OF SOTHEBY’S.

spired by outmoded genres of photographic family portraits, that “we are mutually restricted and interdependent.”<sup>2</sup> The power of the “Bloodline” paintings lies in the intertwining material and immaterial elements of Chinese sociality. The red tracers linking members in family group images indicate that biological matter is always already constituted by kinship.

Given the degree of symbolism in Zhang’s oeuvre, I am interested in the purchase of this portrait of a young man by the wealthy Singaporean. Besides the bloodline motif in this series, there is almost always a translucent mark on the otherwise unblemished faces of his subjects. Is this patch a clue of the suppressed self, as some Western observers have suggested? Or is the blemish a kind of DNA marker, or even the imprint of medical procedure, a cry for healing invisible wounds? Is the Singaporean’s purchase of *Comrade no. 120* an act of reclaiming Chinese ancestry, a tracing of family bloodlines back to the

mainland? Or can one read the desire for Zhang's works as a search for a new umbilical cord that can sustain the contemporary Chinese family in the face of biological damage?

This essay tracks the boom in blood banking in Singapore and the surrounding region as an ethical process of fashioning new lifelines for overseas Chinese navigating biological risks and the pathos of family ruptures. Recent health threats (SARS, avian flu, dengue fever) in Singapore have fueled a sense of renewed biological vulnerability in the midst of modern affluence and have spurred investment in techno-scientific methods as tools of biosecurity. This turn to biomedical procedures opens a window onto the articulation of ethical dispositions at the intersection of the family unit and nation, and rejuvenates an old ethnic/racial solidarity. Indeed, the rise of private blood banking for potential stem cell therapy in the case of future illnesses in the family is predicated on the Chinese belief that kinship is grounded in a material "shared essence" (i.e., blood), which goes beyond the individual or family to include ethnic kinship (see the essays on China in this volume). This being so, we should understand the ethics involved in the use of such biomedical techniques as also not reducible to an individual or family scale, or indeed any single scale, but as engaging different levels of valuation and projection surrounding blood.

A novel configuration of biotech, ethical, and aesthetic elements in Singapore sets the parameters within which blood and its value are constituted. I propose in this essay to track the many registers and scales that can be discerned in the valuation of blood, and to do so will draw links among official tissue networks, the private banking of cord blood, the promissory marketing of blood banks, and representations such as Zhang Xiaogang's paintings. The first of these, the storage of human tissues by the state, is legitimized in terms of securing citizens' future needs, and the embrace of biomedical knowledge and practices is becoming a norm of responsible citizenship. At the same time, private companies advertising cord blood banking boosts the promissory value of stem cells, prompting parents to bank the umbilical cord blood of their infants. Among young educated parents, this biomedical procedure has become what enlightened ethical subjects do. The convergence

of these different circuits of blood creates a biomedical and ethical network that resuscitates folk beliefs in fixed ethnic essences. The enriched possibilities of blood seem to be echoed in the blood symbolism of the lively market in contemporary Chinese art, giving an aesthetic figuration to the projection of diasporic yearnings for material and symbolic connections with the ancestral homeland and emergent world power.

### *Bioethics and Other Ethical Regimes*

The scholarship on emerging economies of human organs has focused on the ethical problems involved when the use of human body parts becomes contaminated by commerce. A popular view of human tissue collection is the fear that even when commercialized organs banks are regulated, they still harbor seeds of social injustice. In their book, *Tissue Economies*, Catherine Waldby and Robert Mitchell warn that the globalization of markets in human organs, as well as recent legal thinking, has blurred any strict lines separating donations from market activity and values.<sup>3</sup> While Waldby and Mitchell decry the exclusion of the poor from expensive biomedical treatments, they also maintain that the production of biovalue can be for the ethical good, for example, in shaping potential biocommons.<sup>4</sup> When we go further, taking a broader range of intersecting regimes—bioethical, communal, and political—into account, we can see the extent to which regulatory systems interact with biotechnologies and cultural values in shaping ethical practices.

Bioethics is currently focused on the subject of clinical treatment and experimentation. First, bioethics is concerned specifically with the ethical treatment of living human tissues, patients, and research subjects in a formalized domain such as the clinic or the laboratory. Second, bioethics looks at the human rights of individuals, and the protections drawn up by bioethicists have become universal standards for conducting biomedical research. Only recently has bioethics started to question the assumption that the moral agent or victim is always an individual; this narrow scale has been expanded by anthropologists concerned about entire ethnic groups, for example, aboriginal populations who are perceived to be powerless against predatory pharmaceutical companies.<sup>5</sup> But the bioethics regime associated with pharmaceutical and clinical practices is only one among many diverse ethical regimes that already operate in the political-cultural spaces of biotechnology.

A useful way to capture the multiple and intersecting scales that are brought together in ethical decision making use what I call a situated approach. I use “ethics” and “ethical” not in the sense of normative morality, that is, to ascribe the values “good” or “bad” according to some abstract universalizing ethical order. Instead, I follow to an extent the thinking of Foucault, for whom “ethics” refers to the self-constituting practices of subjectivity and thus the formation of political sensibility. Instead of ethics as obedience to an established moral order, we have ethics as a critical activity of self-questioning and decision making about truth and the exercise of freedom. Foucault acknowledges some reference to others in the act of ethical self-constitution, but his focus on the care of the self is ultimately concerned with oneself as the ethical substance at stake in one’s action.<sup>6</sup>

While I agree that ethical self-determination is always situated within a shifting field of power relationships, I differ from Foucault by noting that what is at stake in individual moral reasoning is the ethical constitution of the social network in which the moral subject is embedded. Whereas Foucault is tightly focused on the ethical scale of the self-caring subject, my approach locates ethical work in the management of relationships between an individual and overlapping circles of attachments. By situating moral reasoning at the intersection of multiple ethical scales, I hold that individual self-formation is ultimately concerned about weighing the ethical stakes of one’s action for the various collectivities in which one is enmeshed.

I do not reduce my analysis of the ethics of biomedical procedures to the scale of the individual patient or donor, but consider how individual decision is invariably colored by broader contexts of social obligations and collective interests. Whereas bioethics is still very concerned with voluntary choice and informed consent in biomedical procedures, other ethical regimes governing kinship and collective interests (e.g., religion, communalism, nationalism) are in play, influencing an individual’s decision to undergo a biomedical procedure. My concept of situated ethics thus defines the ethical configuration as the space that brings into tension freedom, self-determination, and informed consent, on the one hand, and the moral claims of the family, community, and large collectivities, on the other.<sup>7</sup> However, in certain biomedical situations, ethical decision making formed at the nexus of multiple affiliations may raise skepticism in the “West.”

### *Singapore's Ethical Configuration*

This complex ethical configuration at multiple scales is missed by Western observers anxious about the rise of Asian biotech capacities. Francis Fukuyama has charged that the shift of stem cell research overseas is a form of “ethical arbitrage” whereby research institutes relocate to “ethics-free” Asian environments. He mentions Singapore as an example of a place with “a more favorable regulatory climate.”<sup>8</sup> But picking on Singapore, Fukuyama could not be more off target. The island-state is well known as one of world centers for enforcing international best practices in business, research, and manufacturing. Indeed, every effort is made in Singapore to make visible adherence to international norms and establishing forms of ethical consensus. Indeed, without strict bioethical guidelines in place, the Biopolis hub could not have taken off as an international site of commercial scientific research. The growing centrality of biomedical genomics has cast ethical ripples across the social landscape, as voluntary biomedical decisions enroll broader ethics of collective rejuvenation.

Biomedical genomics in Singapore is working in tandem with a mode of governmentality I call vitalist politics, that is, governing through a pragmatic and ethicalized investment in the vital processes of the total living situation. In the island-nation, vitalist politics is perhaps most visibly realized through the expansion of public repositories of human tissues for the “public good,” defining Singaporeans as a biological public freely sharing a common pool of “Asian” genomic resources. Organ banks and biomedical insurance help configure an emerging space where medical consumers are encouraged to donate and collect human tissues as an ethical necessity for saving and/or extending Asian lives. Public repositories of “Asian” tissues provide a new biosecurity infrastructure for the nation, and new blood technologies suggest a lifeline cast to future generations, and potentially a kind of umbilical cord to vulnerable coethnics beyond the immediate family.

What is the particular set of conditions that have prompted tiny Singapore to become one of the world's most efficient collectors of human tissues? The most important condition is, precisely, cord blood<sup>9</sup> banking, which has emerged as a powerful, pragmatic, and symbolic practice that supports the goal of the government to collect human tissues and stem cells that are compatible with local populations, for

example, in the treatment of leukemia, which is widely perceived as an “Asian” cancer. This small city-state is ahead of the United States in this regard, where only a few state governments, among them California, have set up public cord blood banks; moreover, in the United States, the number of cord blood transplants is still small, and public awareness of cord blood as a treatment is still low.<sup>10</sup>

Another factor favoring Singapore is its attention to ethics. The collection and research use of human tissues have of course been at the center of bioethical debates for decades. In the light of its ambition to be Asia’s foremost biomedical hub, Singapore has been careful in shaping ethical policies. Singapore models its research standards and consent procedures after Britain, which legalized therapeutic cloning in 2001. The following year, Singapore approved therapeutic cloning and established the Bioethics Advisory Committee (BAC). As in Britain, ethical debates were conducted without much fanfare, and ethical concerns, while raised, were muted. An official was quoted as saying that the government had considered issues calmly and did not want to draw attention to its “liberal” attitude toward stem cell research in case it risked igniting religious passions.<sup>11</sup> BAC “recognized the need to moderate extreme views at the outset.” A poll of religious leaders found the main religious groups of Buddhists and Muslims (a combined estimate of 67 percent of the total population) to be “for therapeutic cloning.”<sup>12</sup> Thus, the bioethics board was a means to build ethical consensus among diverse religious communities. BAC describes its ethical position as “just” and “sustainable.” The claim that it is “just” refers to its “obligation to respect the common good, particularly in the sharing of the costs and benefits”; “sustainable” refers to its goal to extend the horizon of social obligation “to respect the needs of generations yet unborn.”<sup>13</sup> Under the law, BAC approved therapeutic cloning to produce stem cells, as well as taking stem cells from aborted fetuses or surplus embryos from fertility treatment. BAC’s sustainable ethics justified the building of a nation-wide system of tissue repositories, a vital infrastructure that makes visible the ethical premises of genomic research. Indeed, as Kaushik Sunder Rajan notes in his contribution to this volume, regulatory structures and human infrastructure work hand in hand in new experiments for making ethical subjects. Singapore is a tentative experiment that enrolls

cord blood donation as an ethical practice beyond the consideration of mere bioethics in the clinic.

The larger background of Singapore's biotech ambition is a deep-rooted sense of political and environmental insecurity. The term used in international relations studies for this phenomenon is "securitization," which occurs when a state claims an existential threat, recognizing a condition of danger that then becomes constitutive of state identity. Critics have argued that this kind of emergency mode of governance should be rejected in favor of a calculative mode focused on diffusing risks through biopolitical interventions.<sup>14</sup> One example of such a calculative logic is the development of "vital security systems" that have the capacity to mitigate threats to the infrastructure.<sup>15</sup> In Southeast Asian contexts, where national crises tend to be precipitated by financial, epidemic, and environmental threats, vital security processes are infrastructural, biopolitical, and ethically framed.

In recent decades, Asian milieus have been poised on the edge of biological disasters: the spread of the HIV virus, the SARS epidemic, and the avian flu. Complex adaptations to health crises and other disasters (the 1997–98 financial crisis, the tsunami of 2005) have created a climate of hypersecurity where new problematizations of nation and population are shaped by discourses of population risks and sustainable ethics. Hypervigilance by the state includes the buildup of biotechnological and biomedical systems in order to securitize the life of the nation. Alongside biotech development, a vitalist politics primes the population to take up novel biomedical practices to mitigate threats to wealth, health, and the future.

Risk-adverse Singapore and Singaporeans are more security-conscious than other Southeast Asians about the assorted challenges and disasters always looming on the horizon. Biotechnology as industry has become the solution to the threat of economic irrelevance in the face of China's emergence as a manufacturing giant. Becoming Asia's Biopolis seems to be the new way to redefine Singapore's distinctive identity.<sup>16</sup> But contrary to Western perceptions, biomedical genomics in Singapore is never simply a commercial undertaking. Its emergence as a center of biotechnology in Asia facilitated its role as a key combatant against the SARS epidemic, as it deployed an array of techniques, from screening arrivals in ports to treating SARS patients in state-of-the-art hospitals. Elsewhere I describe

the confluence of biomedicine, surveillance of body heat, and other high-tech surveillance of individuals exposed to SARS.<sup>17</sup> Fear of body heat transmuted into a kind of political fever, a hypervigilance that primed the population to face future health epidemics. Singapore prides itself as being more ready to face biological risks than, say, mainland China and other Asian sites, where interventions have been slow or spotty. In the midst of regular outbreaks of infectious diseases, the adaptive mechanisms in Singapore are of a more complex order.

This is the emerging complex of governing that I call vitalist politics. Foucault's concept of biopolitics, whereby governing is very much about the well-being of the population at the collective level, has mutated into interventions at an ever more intimate level of biological existence. The term "vitalist politics" refers to the ensemble of biosecurity systems and ethical discourses that are directly and indirectly oriented toward safeguarding the vital elements for securing life in a risky environment. In Singapore, governing is increasingly focused on technical and ethical investments in the total living situation, that is, necessary social practices for people living in the tropics. The growing importance of genetic material in modes of governing and self-governing is crystallizing a notion of citizenship centered on such vitalism. Thus, biotech development in response to perceived risks becomes inseparable from practices of sustainable ethics that make visible Asian populations as vulnerable ethnobiological communities.

This vitalist thrust of biotech rule to secure the anxious present is wedded to a neoliberal calculation to tame future unknowns. The very nature of human stem cell research, of which Singapore is very proud, and now cord blood technology, is based on future probabilities of cures for a spectrum of diseases from cancers to spinal cord injuries. The tension between measures instituted to provide biomedical security and the biomedical speculation they generate creates risks in many areas of investments, whether in infrastructure or in private tissue banking. In security-conscious Singapore, the hype of biotech shares and added-value health insurance seems to encourage risk calculations that speculate on the unknown future.

*Public Blood Banking: "National Life-Saving Resource"*

A discourse of genetics, it has been observed, is increasingly used to describe the human condition, clotting everyday consciousness with

thoughts about genetically inherited diseases, the screening technologies to detect them, and the need for forms of genetic capital and genetic therapies. Such biomedical instrumentalization alters understandings and frames “the ways in which life itself can be owned, capitalized, and patented.”<sup>18</sup> However, in this Asian milieu, biomedical genomics is viewed as an activity beyond potential commercial gains. In many Asian cultures, body parts and genetic materials have particular resonance for the survival and sense of distinctiveness of nations and peoples. At the same time, biomedical science represents cutting-edge modernity. In the public imagination there is growing belief that biobanking is “a life-saving gift,” an unavoidable, even ethical necessity for ensuring collective vitality. This belief in the ethical weight of the bioeconomy is constitutive of new relationships between biomedical knowledge and ethical reasoning at multiple scales.

Leading experts, education campaigns, and biomedical consumers anticipate biorisky scenarios and the biosecurity measures promised by the life sciences. An array of government inducements has increased enrollment in all levels of science education, and youngsters are increasingly switching from seeking jobs in multinational corporations to training as scientists who may end up working in well-funded laboratories. As a term of praise, the phrase “scientists as heroes” was first heard in the combat against SARS (which killed some medical workers), but more recent school campaigns cast leading scientists as rock stars, with their own comic book images. Edison Liu, the head of the Genome Institute is widely recognized as the nation’s top science hero. Official and corporate discourses in Singapore stress the centrality of the life sciences, not only for the economy, but also for “the public good.” A major aspect of making Singapore a science park is to have citizens make voluntary contributions to the ever-growing repository for human organs.

Singapore is one of the earliest Asian sites to collect cord blood, and the public bank has collected over one thousand units, but has a goal of ten thousand units in order to reach the 80 percent match for the patients who need it.<sup>19</sup> Cord blood is a vital source of haematopoietic stem cells (HSC) that are extremely versatile in generating other cells, and are thus a source of potential treatment of heart disease, diabetes, Parkinson’s, Alzheimer’s, and spinal cord injury, among others. Donations are entirely voluntary, and donors sign consent forms. Singa-

pore's strict bioethical regulations give citizens confidence that the use of human materials is ethical and medically sound. As an informant notes, Singapore is focused on biotechnical application for its own population. The accumulation of human organs is "quite pragmatic: these donations are made only to citizens. It bypasses the need for the sale of organs, which is criminalized."<sup>20</sup> The sale of human tissues and organs is strictly forbidden.

In establishing a reputation for transparent and ethical regulation in biomedical research, Singapore has sharply distinguished itself from rival Asian countries such as South Korea, which has been criticized by Western observers as lacking "an adequate system of science governance."<sup>21</sup> Furthermore, the well-regulated Singapore tissue banks are an object lesson for preventing the kind of health situation that occurs in China, where HIV and other infectious risks have arisen because of poor regulation of blood transfusions. As Kathleen Erwin notes, rampant illegal sales of blood in China have transformed the "gift of life" into a "commodity of death."<sup>22</sup> Singapore's clean reputation is clearly part of a bid to become a significant global player; and rigorous ethical standards must begin at home.

Appeals to both national and private interests spur voluntary contribution to a public cord blood bank. "Parents-to-be will play a vital role in successfully building up our national life-saving resource," said the director of the facility. "The more donated umbilical cord bloods we collect and store, the higher the chance of patients finding a match at the Singapore Cord Blood Bank. Hence, we'd like to encourage more parents to donate their baby's umbilical cord blood, which would otherwise be discarded after childbirth." Furthermore, there is an appeal to self-interest that articulates ethnicity. The cord blood bank director notes that because "of their unique ethnic immune genotypes, 65%–80% of Asians worldwide currently are unable to find a match" in blood stem cells, a distinct disadvantage should they need stem cell transplants.<sup>23</sup> Such claims about the need for intra-Asian blood collections were borne out in 2005 when a Singaporean leukemia patient received cord blood from the Shanghai Stem Cell Bank, which has the largest collection in China. The patient's family had contacted stem cell banks in Singapore, Taiwan, and the Chinese mainland for a genetic match.<sup>24</sup>

The majority of Singaporean Chinese are descended from dialect

groups (e.g., Hokkien, Teochew, Cantonese, and Hakka) that at one time collectively identified themselves as *Tangren* (people of the Tang dynasty, not Han) from southern China. Since the 1970s, language policies have reconstituted the dialect groups as a single Mandarin-proficient (but largely English-speaking) ethnic Chinese population.<sup>25</sup> The new biomedical technologies now add a scientific heft to historical, cultural, and ethnic affiliations, thus further drawing disparate Chinese ethnicities in Southeast Asia, China, and Taiwan into a diffuse “racial” collectivity (see essays by Jennifer Liu and Wen-ching Sung). The promise of blood transfusion for leukemia has stirred a new kind of altruism as overseas Chinese receive scientific evidence of their long-held belief in a single Chinese race. Thus in Singapore and other Asian sites, the biovalue of tissue repositories goes beyond the commercial gains, becoming the expression of a new moral bioeconomy to treat race-specific problems in a transnational realm.

As elsewhere, tissue donation is a new practice of the affluent and educated classes, which in Singapore tend to follow ethnic lines. The Singaporean population (approximately 4.5 million) is dominated by ethnic Chinese, with small proportions of ethnic Indians and Muslim Malays. There is a human organ transplant act (HOTA 2004) that allows for the removal of organs—liver, heart, and corneas, all for transplant after death—from citizens and permanent residents, unless they have previously made objections. Opting out is not just a biomedical option, but a mechanism that separates those who contribute and those who do not to the nation’s “pragmatic” approach to biosecurity.

Attempts to register organ donors by ethnic group have proceeded steadily as the authorities seek to have proportionate organ donations by each group in order to balance their ethnic representation on wait-lists for organs. Widespread complaints that Malays lagged in organs donation resulted in the overturning of Muslim religious prohibitions, and the pressure is toward enforcing proportionality in organ donations as a mark of common citizenship. The discourses of bioresponsibility are mapping ethnic and racial communities as more or less amenable to the life sciences, as well as contributing to the production of the national store of banked human tissues.

The Singapore example of a state-driven opting-out program for harvesting organs (now being copied by Great Britain) is a clear alterna-

tive to the situation envisaged by Waldby and Mitchell, in which privatized blood banking becomes the prerogative of the wealthy and a threat to an emerging biomedical commons.<sup>26</sup> The Singapore case further complicates the conventional picture because it demonstrates that the establishment of a public tissue network need not reduce privatized blood banking, but could in fact indirectly stimulate it, as a private investment in speculative biosecurity, that is, a new kind of biological insurance that shapes a reimagination of the shared essence of a bionation.

### *Private Blood Banking*

#### SPECULATIVE AND INSURABLE VALUES

As interest in Singapore's biomedical future heats up, new parents are induced to become more knowledgeable about technology by anticipating biorisky scenarios and the biosecurity promises offered by the life sciences. In newspaper articles, expectant couples are encouraged to consider a new kind of biological responsibility. Besides finding a name and a nanny for their new baby, young couples must now ponder "the option of taking 'biological insurance,'" that is, consider storing their baby's cord blood. They must throw their infant a "lifeline" for future medical emergencies.<sup>27</sup> The news media churn out hopeful stories of potential cures for "Asian" diseases, and the "life-saving" value of their newborn's blood as a source of stem cells. Writing from the redoubt of Harvard University, a state-employed Singapore scientist first acknowledges that it is difficult to dismiss fears that the biomedical sciences may be used in a way that violates the autonomy of the child, as, say, by seeking the creation of "designer babies." He then offers an alternative view, that "expanding mankind's control over human reproduction is nothing more than an extension of the parental responsibility to care for one's offspring."<sup>28</sup> Such expressions of biomedical hope and new parental responsibilities instill a sense of need for private blood banking. Because genomic cures are still in the future, there is a speculative dimension to claims about the curative power of stem cells, but the promise of anticipated scientific miracles speaks to the anxiety of people eager to be modern and "techno-savvy" parents.

Beyond media reports, the commercial stimulus behind such beliefs comes from the company CordLife, the first "fee-for-service" tissue storage facility in Southeast Asia to be accredited by the American

Association of Blood Banks. Founded in Singapore in 2001, CordLife has been praised by the Singapore government for contributing to the island's growth as a hub for world-class health care services. The founder is Steven Fang, a British-trained Singaporean engineer who has had experiences working with pharmaceutical companies in the United States. Believing that bioentrepreneurship is the new thing, Fang uses technologies developed at Harvard and the Massachusetts Institute of Technology for stem cell procedures in order to set up commercial blood banking throughout the Asia-Pacific region. For this achievement, the company was named a "Technology Pioneer" by the World Economic Forum in 2007, a recognition that gives Fang access to the global venture capitalists who gather in Davos. Fang himself was given a "Young Entrepreneur" award. He talks to me about the chief motivation behind his business: "The pharmaceuticals business is established with the view to save lives. Changing life is greater than making money. Stem cell technology must be made available to the masses, i.e., Asians."<sup>29</sup> The parent company of CordLife, CyGenics Ltd., is registered on the Australian Stock Exchange. CordLife is the only private blood bank to have AABB accreditation in Singapore, and although it is now extending its reach to North America, it is still mainly focused on providing facilities for storing cord blood in Asia (it has facilities throughout Southeast Asia, and has recently expanded into North Asia, India, and Australia). According to Fang, the company's ambition is to build up the blood inventory in order to catch up to current world leaders in stem cell therapy within a decade.

This articulation between biocapital, bioethics, and technological advancement is driven home in a variety of educational programs. Fang describes CordLife as the "caretaker of the client's blood, like a commercial bank with safety boxes, ensuring the quality [and] usability" of what is banked, and the company's liability (contracts specify a term of twenty-one years, which is renewable). Fang notes that because CordLife is the first company in the field, it has been "easy to convince everyone" of the need for its services, which it has done by selling "through fear," that is, by presenting troubling data on childhood and teenage vulnerabilities, and by advising that "parental safeguards are needed" to protect their children.<sup>30</sup> On its Web site, CordLife urged Asian parents: "Storing your child's precious cord blood stem cells provides you with peace of mind. It can be your child's future key to

treatment of more than 80 diseases.”<sup>31</sup> Family cord blood banking will not only secure a private source for potential autologous transplants (where the donor and recipient are the same individual), but also bypass risky sources of allogenic (donated) tissues in the few public repositories throughout Asia. Responsible parents wishing to protect their children against genetic risks by investing in potential cures have no choice but to bank the cord blood (see figure 2). The emphasis is on a new way of delivering cures, and on engendering a new kind of parental responsibility to invest in what is still an uncertain form of therapy.

The various reports and statements of the industry and its commentators make it clear that blood banking compares itself to the money market, using terms such as “banking,” “insurance,” “value,” “capital,” and “investment in the future.” There is much “hype” surrounding publicly traded biotech firms and their dependence on “promissory biocapitalist futures” to increase their economic value, as Sunder Rajan notes in connection with firms in Silicon Valley.<sup>32</sup> Capital operates within speculative markets “in which prices [values] move in response to the balance of opinion regarding the future movement of prices,” as another study notes.<sup>33</sup> But the speculative stories surrounding biotechnology markets also contribute to the production of other kinds of values, especially the ethics of responsible health practices. Privatized blood banking can be compared to a speculative market where the opinions of doctors, politicians, and bioentrepreneurs drive the growth of economic and ethical values of family investment in the technology. Cord blood banking operates within speculations about the future movement of biomedical value in response to stories of hope (instead of the balance of actual cures created or available). By raising awareness of genetic information, predictions of potential therapies add an ethical value to private investments in blood banking, which becomes a family treasure store of potential cures.

Indeed, the Singapore state is reinforcing such understandings by pushing bioinsurance. Parents who bank their newborn’s blood with CordLife are now covered by NTUC Income, one of the largest state-controlled insurance companies in Singapore. The policy is called Mediscord, and it has three plans of varying costs. The insurance is sold by speculations about the future: “As *more* treatments are discovered and cord blood stem cell therapy *becomes more* widely available, the number of such transplants using cord blood *is expected to rise* in the years



**Figure 2** “Cord blood banking emphasizes the responsibility of expecting parents.” COURTESY OF CYGENICS CORDLIFE, SINGAPORE.

ahead” (emphasis added).<sup>34</sup> Bioinsurance adds to the speculative nature of the tissue economy by adding an ethical value to the practice of family blood banking.

#### BIOSUBJECTIVIZATION

The hothouse atmosphere of scientific Singapore raises speculative and insurable values in cord blood banking, thus creating a realm of what we may call biosubjectivization. The flood of information on genetic illnesses primes family anxieties and brings about two kinds of subjectifying effects: the normalization of hedging biological risks, and the interweaving of biomedical practice and ethnic thinking.

Company handouts and articles that appear in the media at the rate of one to two a week aim to change family thinking about ethnicity. Fang agrees that the overall effect is to “strengthen ethnic identity” because of the linking of family blood to the delivery of cures for illness in the family. He gives an example of a mixed-race family who, he said, should not draw on donated blood for fear that it might be incompatible and rejected by their bodies. The private storage of blood from one’s children as a means of potential cure will increase the belief in

and feeling of a family's ethnic identity.<sup>35</sup> Questions about whether stored stem cells will be useful as therapies in the long term, or in the case of genetically inherited diseases, are not publicly discussed.

The convergence of biocapitalist and family interests promotes blood banking as a form of self-governing practice that anticipates and plans for biological possibilities in the family's future. The notion of hedging against hazardous biological futures is spreading among ordinary citizens, regardless of whether they have members of the family who can benefit from such practices in the present. Indeed, the private banking of cord blood requires thinking in the present about possibilities of future interventions using stem cell therapy, and such thinking fosters responsibility among parents to hedge against risks in their children's future. This new economic and ethical configuration of the parental role goes beyond standard healthy child-rearing norms such as the immunization of infants. The effect of biotech information is to relocate an older parental obligation toward children in a new site of possible insurance for a child's future. This new responsibility to participate in what is still a speculative biomedical market for the sake of the imagined future vulnerabilities of one's child may be too demanding an ethics of biosecurity.

Nevertheless, at a CordLife fair I attended in Singapore, many young expectant couples were drawn to the booth for baby gifts and brochures urging them to sign up right away for cord blood storage to the tune of about \$1,000 local dollars the first year, and a smaller fee in subsequent years. It appears that cord blood banking is becoming normalized among the younger generation of parents. Newspaper reports about parents having a new baby in order to provide stem cells for a sick older sibling<sup>36</sup> further reinforce the sense that the expenses are worthwhile because they can secure the health of more than one family member. The growth of public tissue banking is never enough, or is beside the point, to parents caught up in the need to invest in this hedge fund to profit their children's biological future. At a global level, Waldby and Mitchell note that cord blood has acquired a "speculative value" that partakes of the dream of regeneration, "the dream that every biological loss can be repaired."<sup>37</sup> The dream of hedging your bets in the realm of biological risks to children is spreading among a new generation of affluent parents, who come to consider cord blood banking as yet another medical responsibility when a child is born.

In 2003, CordLife acquired Cytomatrix, a Boston stem cell company, thus gaining expanded research facilities to produce human T cells, a critical component of the immune system.<sup>38</sup> Now with a United States base, CordLife is promoting the practice of storing cord blood in America, at least among parents on the East Coast. In 2006, an American friend of mine who gave birth in a New York hospital was advised to store her infant's blood with CordLife. She and other mothers in the ward agreed to bank their babies' cord blood, as yet another area opens up for hedging bets in these anxious times. My New York friend sent me the CordLife materials for Americans, and I note that there are no pictures of pregnant Asian parents (as there are in figure 2), but a key image is of a female Caucasian toddler looking at her navel.

In Singapore, the ethics of this form of health management for the affluent is different from the ethical strategies adopted by patient advocate groups who network in the interest of sick loved ones.<sup>39</sup> Rather, the ethics of investing in cord blood as a possible therapy in the child's future is an extension of the ethics of management of risks to which the family group may be exposed in the unknown future, that is, a kind of entrepreneurial preemptive action to bank against the possibilities of biological risks for their children. Cord blood insurance is becoming one more element—besides insurance of the family home, car, laptop, and so on—in an ethicomaterialist ensemble that knowledgeable Singaporeans must invest in. The commercial manipulation of bioanxieties among the newly affluent appears to be limitless, promoting a kind of vitalist citizenship that attempts to control any foreseeable biological risks.

### *Recoding Ethnokinship*

The link between blood banking and the expansion of parental responsibility strikes a deep resonance especially among the ethnic Chinese. Singaporean Chinese, no matter how Westernized in education, continue to view blood as the substance and symbol of kinship and filial piety. There is such profound, unquestionable belief in blood connections that kinship ethics cannot be separated from the continuity of family bloodlines. These cultural beliefs provide an interesting comparison to the British situation described by Marilyn Strathern. In her study, genetic material is transferred but has no kinship value; she cites the case of egg donors who feel no biological or moral connections to

the eggs that they provide to childless couples.<sup>40</sup> Similarly, in Chinese beliefs, embryos do not have kinship status per se. But in the Chinese case this is because only the baby born into the family is a social person; embryos not used or discarded by the family are nonhuman and never had kin value to begin with. There is thus in Chinese beliefs a sharper separation between what is considered family tissue and what is judged to be unwanted biological material, which has no symbolic meaning. Not only is there no possibility of moral connection to rejected reproductive tissues, but they are considered part of “hospital waste.” At a Singapore fertility clinic, a patient told me that her surplus eggs are just “waste matter” that the government is free to collect for “scientific research.” Genetic materials such as blood only have symbolic investment when they are part of the originating family, or useful for safeguarding its health. Blood is meaningful only when it circulates within the kinship network.

The perception of the individual as a cluster of blood cells in a larger configuration of blood is powerfully suggested in painting 16 of Zhang’s “Bloodlines,” *The Big Family*, which depicts a red baby emerging from a family unit composed of figures linked by bloodlines. The notion of family bloodlines is common in many cultural regimes, but the Chinese have long considered the giving of blood the most powerful expression of interconnectivity and loyalty. Kinship links between the family of origin and the family of procreation depend in a material way on the flow of female blood. Female blood carries strong emotional resonance because of its association with life-giving and life-sustaining capacities. In the old days, female blood as a symbol of health and filial love found expression in a daughter’s drawing of her own blood to make soup for a sick parent or parent-in-law. As life-givers, women are very powerful, but this power to cross life and symbol borders is obscured by pollution beliefs about the “uncleanliness” of female blood. Menstrual and birth blood are “out of place,” that is, they are symbolically unclean—not because they lack value but because such bleeding is a forceful reminder of female power and its threat to male authority.<sup>41</sup> As “outsiders” in a still-patrilineal culture in Singapore, ethnic Chinese women rely on the birth of sons to anchor themselves in the male-oriented kinship system.

Whether these beliefs percolate in the heads of young couples as they eagerly peruse documents at the CordLife fair, I could not say. But

their easy embrace of this technology, just one more really scientific thing to do in preparation for the baby's future, gives new meaning to the material and symbolic links between mother and the newborn. When I asked the expecting couples why they were interested in cord banking, my question drew blank stares: "Of course, we will do anything to protect the health of our baby!" To these couples, the question seemed silly. By becoming a biomedical tool, birth blood (contained in the placenta and usually thrown away at the hospital) now enhances the mother's status as the producer of new biovalues and endorses the technomodernity of parents who wish to protect their child against unknown kinds of future bioinsecurity.

The combination of blood bonds and blood-storing mechanisms promises to give new vitality to ethnic Chinese family values, reexpressing traditional beliefs but also rejuvenating and manifesting them in new ways. Folk beliefs in the regenerative capacities of blood are now confirmed by the life sciences, further reinforcing the concept of blood as a transnational biovalue that Chinese people share, no matter where they are located in the world. The possibility of storing this blood for use at a later time and in a different space, by one's own child or other children, bolsters beliefs in biological sameness and vulnerabilities.

The project of collecting blood as a life-saving resource, at both the public and the private level, is giving a modern visibility to the ethnos as a blood-sharing community. Attempts to sort Asian blood donations by ethnicity in public blood collection drives for leukemia treatments strengthen traditional beliefs in the potency of shared biological essence. The beneficiaries of these public blood drives are not known by the donors. Cord blood banking, by contrast, is a private practice, and donations benefit family members. The family benefit, while paramount for donors, is not the only advantage of private cord blood banking, for the commercial storage of blood preserves genetic materials that could be made available to a wider collectivity.

Private cord blood banking can be an important supplementary storage system that expands the public tissue network, perhaps increasing the availability of distinctive strands of Asian DNA materials for private or public uses. This complementary relationship of public and private blood banking broadens the circle of blood sharing beyond the family to the community and the cross-border collectivity of Asian patients needing stem cell therapy. The cumulative effect of giving blood in

private arrangements and in public collection drives creates a biomedical code for deep-seated beliefs in a shared material essence among Chinese people at large.

Descriptions of tissue economies depend on strict binary oppositions between private and public, autologous and allogenic tissues, restrictive and collective repositories. Such perspectives cannot capture the complex interactions and ethical decision making that occur at the intersection of bioethics and other ethical regimes, that is, in the space of a particular ethical assemblage.

Southeast Asia and sites beyond it are haunted by social upheavals and recurring biological disasters, which have marked modern times. Beneath the glittering urban scene, the fate of peoples and nations is still precarious. Added to this complexity, we find techniques of biosecurity and bioinsurability that raise other ethical issues, giving rise to a vitalist politics that seems to sharpen ethnic differences, and a bioeconomy that is based on an ambiguous projection of future demographic differences and needs. It is clear that bioethics must move beyond the clinic to consider moral decisions and dilemmas linked by overlapping scales of risk and ethics.

Among the privileged ethnic Chinese of Singapore, the embrace of blood banking can be situated within a transnational network of inherited culture and health dilemmas. Such practices point to a new coding of genetic substances as signifying a kinship that extends beyond the immediate family to a tentative biosociality emerging out of shared diseases, genetic materials, and bioscience practices.<sup>42</sup> New genetic technologies thus suggest new ways for engaging in a kind of social autoproduction that already proceeds on other fronts.

As Sarah Franklin and Susan McKinnon have noted, “The substantial-codings that might signify kinship include a diverse range of phenomena—including genetic disease syndromes, the ‘informatics’ of computer programming, and family photography.”<sup>43</sup> In Singapore, cord blood banking may be the “substantial-coding” that signifies an expanding ethnokinship. The mobilization and concentration of new genetic information in blood banking stirs an old imaginary of an ethnos that is both historically rooted in shared essence and transnational in scale.

Contemporary harnessing of blood, prompted by pharmaceutical in-

terest, stirred by biopolitical risks, and produced by biotechniques, animates and ramifies a rich kinship symbolism that reverberates across science and commerce. Overseas Chinese have long placed great importance on photographic ancestral portraits, a form that inspires Zhang's paintings, as a means for registering and tracking kinship connections across time and space. In this light, the acquisition of Zhang Xiaogang's *Comrade no. 120* by a wealthy Singaporean becomes a poignant emblem of acts by overseas Chinese that "re-member" China, by reconnecting family bloodlines to mainland ancestor figures. This purchase of an anonymous "ancestor" seems a symbolic substitution for the dwindling practice of ancestor worship, especially when Chinese in diaspora are separated from the graves of ancestors on the mainland and from the rich soil of cultural China. Now, thanks to private blood banking, the act of preserving bloodlines can be extended literally, into the distant future and across transnational space. The banking of an infant's blood, like the collecting of ancestral ghosts, is a new practice among affluent Chinese who link the ethical decisions they make to safeguard their children's health with re-membering the umbilical cord that connects them back to the motherland.

This desire to be linked materially and symbolically to the motherland gains symbolic resonance as well from Zhang Xiaogang's global prominence in the contemporary art world. The aesthetic figuration of modern "Chinese" experiences and essences in the paintings that circulate in global art markets articulates the emerging status of modern Chinese subjects who have the means to perform the ethical role of owning and protecting works fraught with "Chinese" symbolic value. In an interview broadcast on CNN, Zhang said that he paints his black-and-white faces in order to depict "cloned people, as if dreaming." The faces are poised between amnesia and memory of emotional connections to family members once lost but now recoverable. In his "Bloodline Series," the faint marks, like scars, that we see on each face form a recurring motif that connects the individual pictures. One painting depicts a baby's face already marked by some genetic defect, as if signaling the need for biomedical vigilance and intervention by his loved ones. The "scar" is both a trace of the elusive memory and the imprint of flowing bloodlines. These reflections on the Chinese "big family," Zhang confides, is crucial to an "understanding of life itself."<sup>44</sup>

## Notes

This essay draws on intensive interviews with officials, scientists, journalists, bioethicists, bioentrepreneurs, and citizens in Singapore and elsewhere from 2002 to 2008. I thank Andy Hao, Catherine Waldby, and Charles Briggs for helpful comments on earlier versions.

1. Sotheby's Contemporary Art Evening Auction, sale Lo8020, London, New Bond Street; session 1, February 27, 2008, [http://www.sothebys.com/app/live/lot/LotDetail.jsp?lot\\_id=159430431](http://www.sothebys.com/app/live/lot/LotDetail.jsp?lot_id=159430431).
2. Quoted in [http://www.operagallery.com/artist/ZHANG+Xiao+Gang\\_659;0;0.aspx](http://www.operagallery.com/artist/ZHANG+Xiao+Gang_659;0;0.aspx) (accessed December 2009).
3. Catherine Waldby and Robert Mitchell, *Tissue Economies: Blood, Organs, and Cell Lines in Late Capitalism* (Durham: Duke University Press, 2006).
4. *Ibid.*, 158–59.
5. Cori Hayden, "Benefit-sharing: Experiments in Governance," paper presented at the Social Science Research Council Workshop "Intellectual Property, Markets, and Cultural Flows," New York, October 24–25, 2003. Hayden has argued for a notion of "benefit-sharing" of native bioresources as a matter of justice for encouraging a more equitable distribution of values among sourced communities and bioprospecting and biomedical entities.
6. Michel Foucault, *Ethics: Subjectivity and Truth*, vol. 1 of *Essential Works of Foucault, 1954–1984*, ed. Paul Rabinow, trans. Robert Hurley and others (New York: New Press, 1997), xxxiii–xxxiv.
7. A related but different concept is Michael Fischer's "ethical plateaus" or domains of ethical challenge engendered by the workings of biotechnologies, information technologies, and environmental sciences that elicit, shape, or help constitute embedded subjectivities. See Michael M. J. Fischer, *Emergent Forms of Life and the Anthropological Voice* (Durham: Duke University Press, 2003).
8. See Joseph E. Davis, "An Interview with Francis Fukuyama," [*Paleopsych*] *Hedgehog*, October 19, 2004, <http://lists.extropy.org/pipermail/paleopsych/2004-October/000710.html>.
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22. See Kathleen Erwin, "The Circulatory System: Blood Procurement, AIDS, and the Social Body in China," *Medical Anthropology Quarterly* 20, no. 2 (2006): 139–59.
23. Quote by the Children's Cancer Foundation (Singapore), on the Cord Blood Bank of Singapore Web site, "Strategic Alliances," [http://www.ccf.org.sg/train\\_research/cord\\_blood\\_bank.html](http://www.ccf.org.sg/train_research/cord_blood_bank.html) (accessed December 2009); the author of this unsigned article is Dr. Fidah Alsagoff, executive director of the Children's Cancer Foundation.
24. "Umbilical cord blood headed from China to Singapore," *Stem Cell Research Blog*, August 21, 2005, <http://stemcell.taragana.net/> (article no longer available).
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28. Koh Buck Song, "Perfect People's Fears," *Today* (Singapore), April 14, 2004.
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30. *Ibid.*
31. Quotation from <http://www.CordLife.com/> (accessed March 19, 2006).

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