

Genomes and Genealogies: Decoding Debates about deCode

by

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Abstract

Recent developments in biotechnology have opened up an entirely new biological and social world in which a multitude of different kinds of bodily components, such as blood, genes, gametes, enzymes, tissues, and organs, can be isolated and used for medical and scientific purposes. As a result, newly identified bodily components are quickly absorbed into the market place where they are exchanged in the form of commodities. The commodities are both biological and informational, taking the form of genealogies, medical records, and genetic characteristics of individuals and entire populations. At the same time, many of these developments are met with heavy criticism and organized opposition. Developments in Iceland are a case in point. This paper reflects upon debates about plans for developing a central medical database on Icelanders following controversial laws passed by the Icelandic Parliament in December 1998. I attempt to situate these debates in the Icelandic and the international context, focusing on common property theory, public discourse of eugenics and gene action, and the contribution of anthropology to the understanding of the central issues involved. Among the many questions raised by ongoing biotechnological developments in Iceland are the following: What makes the Icelandic human genome a valuable commodity? How and why is it contested? In what sense are genetic information and genealogies common property? How are the tensions between private and communitarian perspectives played out in human genome projects?

This paper reflects, somewhat tentatively and prematurely, upon debates about biotechnology, especially those associated with the database of deCode Genetics, a start-up genomics company in Reykjavik that has been granted exclusive rights to develop a central medical database on Icelanders. “Tentatively and prematurely” because the paper raises more questions than it answers, written as it is in the early stages of a large-scale project on discourse on the Icelandic medical database, and at the beginning of ethnographic fieldwork at deCode. I attempt to situate the debates on Icelandic biotechnology in the domestic and the international context, focusing on common property theory, public discourse on eugenics and gene action, and the contribution of anthropology to the understanding of the central issues at the intersection of biotechnology and society.

Parts of the body – organs, hair, skin, nails, and blood – have for a long time been isolated and used in various ways to build up the knowledge of physiology, as Foucault outlined in his work *The Birth of the Clinic* (1973). Recent developments in biotechnology and bioinformatics, however, have opened up an entirely new biological and social world. Not only do they facilitate the isolation and use of a multitude of different kinds of bodily components, such as blood, gametes, enzymes, tissues, and organs, for medical and scientific purposes. Also, they shift the focus to bodily information, genes, enzymes, and DNA sequences. The critical issue in post-genomic research, after the sequencing of the human genome, is the use and control of information that can be derived from bodily components rather than the bodily components themselves. Significantly, these developments have taken place in a social environment where the partnership of science and the market is considered to be the most efficient means of advancing knowledge and human wellbeing (Fox and Swazey 1992, Komesaroff 1995, Titmus 1997, Starr 1998). As Rheinberger observes (1995: 255), “the boundaries of what used to be perceived as basic research on the one hand and its medical applications on the other have been blurred in an unprecedented fashion.” As a result, bodily components and bodily information - genealogies, medical records, and genetic characteristics of individuals and entire populations (Martin and Kaye 1999) - are quickly absorbed into the market place where they are exchanged in the form of commodities. Anthropology has studied some of these developments, partly as a result of growing interest in various aspects of the human body, including bodily experience (Jackson 1989, Czordas 1994), concepts and technologies of

reproduction (Martin 1989, Ginsburg and Rapp 1995, Rapp 1999), disability (Ingstad and Whyte 1995), medical ethics and practice (Lindenbaum and Lock 1993, Kleinman 1995), and biotechnology and human genome research (Rabinow 1996). Many of the developments associated with post-genomic research are met with heavy criticism and organized opposition. For some people, post-genome projects signify the arrival of a new eugenics movement. This is an exaggeration, however, as I argue below.

One clear consequence of the development of modern biotechnology and related developments in cybernetics and bioinformatics is the radical re-evaluation of existing notions of kinship connections and personhood (Strathern 1992, Franklin and Ragoné 1998, Edwards *et al.* 1999) and what it means to be human (Davis-Floyd and Dumit 1998, Hayles 1999, Strathern 1999). This is exemplified by discussions of the social implications of and reactions to the idea of human cloning, the practices of surrogate motherhood, organ transplantation, and genetic engineering and how these products of bioscience could and should relate to the world of commerce. The issues of property, ownership, and access have also been central in both contemporary debates on biotechnology, particularly in relation to post-genome projects (Greely 1998), and recent anthropological and legal thought (Hann 1998, Radin 1996). Thus, for some months now, there has been an intense tug-of-war between communitarian and private perspectives on human genome projects. On the one hand, the nonprofit Human Genome Project plans to openly share data from its decoding of the 3 billion chemical units of DNA that make up the genetic pattern of humans. The aim of the Human Genome Project is to publish a full genetic map on the Internet by 2003. That plan, however, has been challenged by a private company, Celera Corporation. Celera not only announced that it would complete mapping the human genome in a fraction of this period by different means, at tenth the cost of the \$2 billion publically funded project, also it has applied for thousands of patents on genes it has discovered in the process. There have been negotiations between the two projects, but they seem to have collapsed. On 14 March this year, President Clinton and Prime Minister Blair issued a joint statement (*The New York Times*, 15 March) in an attempt to bring things under control, urging nations, scientists, and corporations to freely share their information on the human genome. These developments raise interesting questions about ownership and property which, no doubt, will be actively contested in both the academic community and the legal and political realm over the next months and years.

The present paper focuses on a limited aspect of property debates in the domain of biotechnology, surrounding the Icelandic human genome project. Iceland has been the site of complex and controversial biotechnological developments. deCode has burst on the local and global scenes with a project to map the genome of the Icelandic people as part of a larger medical database. It will do so by using a unique combination of the most advanced gene mapping strategies for locating multi-factorial diseases, clinical records dating back to 1915, and a genealogical database that seeks to locate all living Icelanders, as well as a substantial proportion of those who have ever lived, on a computerised database. I have been following these developments, the expansion of the company, the construction of the database, and the public debates surrounding them. deCode, it is an understatement to say, is a “phenomenon” of local and global interest. It follows that it should be of anthropological interest. Among the many questions raised by ongoing developments in Icelandic biotechnology and informatics and their articulation with local and global worlds of commerce are the following: What makes the Icelandic human genome a valuable commodity? How and why is it contested? What exactly constitutes property in the domain of biotechnology and informatics? In what sense are genetic information and genealogies common property or property at all? How are the tensions between private and communitarian perspectives played out in human genome projects?

deCode Genetics, Inc., and Icelandic DNA

deCode was founded in 1996. The company was funded by venture capital funds coordinated in the United States. Of course, in this moment of globalizing capitalism such monies have no nationality. Although deCode is legally a United States company (most biotech companies in the world are given a fictitious Delaware location for legal, tax and patent advantages), it operates entirely in Iceland and has had majority Icelandic ownership from its foundation. Later on, deCode strengthened its financial position through a huge business arrangement with a pharmaceutical giant, Hoffmann La Roche, an agreement that focuses on research on twelve common diseases. After nine months of national debate, in December 1998, the Icelandic Parliament passed a bill authorising the construction of a national medical database. The licence to construct the database would be open to competition, the licensee would finance it, and the

resulting database would belong to the National Health Service with the licensee retaining privileged rights to commercialise it for 12 years.

deCode and the planned database have been the focus of controversy from the start. There have been some hundreds of newspaper articles in the Icelandic press about the medical database that is in the making, numerous television programs, a series of town meetings and endless discussion and debate both within the Parliament and in the shopping centers, cafes and dinner tables of Iceland. Understandably, Icelanders have been quite attentive to the issues involved. For one thing, the database has raised important concerns about ethical protection and the principle of informed consent. Often, this has been a purgatory exercise, much like that discussed by Rabinow with reference to “French DNA” (1999). On the international scene there has been extensive coverage, in the world press and on major TV channels, of the company, its director (Kári Stefánsson), the scientific project, and the database deCode proposes to construct. This coverage has used deCode to illustrate the potential dangers and concerns as the media currently thematize them. Now deCode has received the license to construct the database and the work is already under way.

What, we may wonder, makes the Icelandic human genome a valuable commodity? For one thing, due to its demographic history Iceland has certain appeals to investors in human genome research, as a natural genetic laboratory. Iceland was settled from Scandinavia and the British Isles in the eighth or the ninth century (the “official” date is 874). The population grew up to about 10 to 20 thousands in the first 60 years and by 1300 it is expected to have reached 70 thousands. A series of demographic bottlenecks, however, reduced the population in the following centuries, a pneumonic plague in 1402-4, a smallpox epidemic in 1708, and a volcanic eruption in 1784-85. By 1800 the population was only 40 thousands. As a result of the successive reduction of the population during times of plagues and famine, the Icelandic human genome is fairly homogeneous; some of the branches of the family tree, so to speak, have repeatedly been cut off with certain lineages becoming extinct. Because of Iceland’s isolation in the North Atlantic Ocean there were few mechanisms to replenish the genetic diversity of the population. Given these characteristics, and the sheer smallness of the population, the Icelandic human genome has clear advantages for genetic and medical research. Icelanders, however, are no genetic Robinson Crusoes. Throughout its written history, Iceland has regularly been visited by slaves,

pirates, fishermen, and travellers. Recent research in biological anthropology, based on DNA analysis and demographic studies indeed indicates that while Icelanders are more homogeneous than most other European populations they nevertheless contain a surprising amount of genetic diversity for a small island population (see Helgason *et al.* 2000).

Another important factor for the Icelandic human genome project is the availability of detailed written records. The deCode project is not only plausible and scientifically promising in Iceland because the population has been small (275,000 today), relatively homogenous and comparatively isolated, but also because Icelanders have a passion for keeping genealogical records. This passion relates to many factors of anthropological interest, but unlike the Mormons who have an equally detailed devotion to family records, the motivation in the Icelandic case does not turn on religion, nor do the records cover a recently diasporic community. In Iceland several kinds of records on families and genealogies are available - the “Book of Settlement” (written around 1125) and the Family Sagas, in addition to church registers, administrative records, and censuses (the first one, arguably the earliest complete census in the world, is from 1703). The modern Icelandic term for anthropology, *mannfræði*, dates back to the saga age. Literally, the term means “the study of humans,” but, traditionally, it referred to knowledge about people, families, genealogies, and social relationships. Someone who was knowledgeable about *mannfræði* was said to be *mannfróður*, knowledgeable about social and genealogical relationships.

The significance of genealogies during the saga age does not suggest that Icelanders were preoccupied with the structural relations of kinship. In fact, friendship was a powerful social relationship, judging from the accounts of the Family Sagas (see Durrenberger and Pálsson 1999). Nor does the existence of genealogical records from early on testify to a concern with “ethnic roots,” in the modern understanding of the term. These records were originally constructed and maintained as part of claims about ownership of land. During the saga age and the following centuries, the notion of “Icelanders” was not an ethnic label but simply a reference to those inhabiting the island (Pálsson 1995, Hastrup 1998). With the “struggle” for independence from Denmark, however, during the 18th and 19th centuries, the notion of “Icelandicness” was invested with a heavy nationalistic load and forced upon the distant past. The

nationalist idea of a “natural” relationship between the land, its people and their language was born, an idea underlined by the local eugenics movement.

Who is entitled to what?

There are two kinds of property issues in the debates surrounding deCode and the Icelandic medical database, involving medical and genealogical records. Both have been highlighted in recent developments following the granting to deCode of the licence to construct the database.

Medical records: A fundamental debate has taken place concerning the ownership of, and access to, genetic information and medical records. Perhaps the dominant focus in the debate is the fact that a private company proposes to construct a genomic map of the Icelandic people (as part of a State-owned and operated database) and to commercialize information contained in it. Such a concern has not only frequently been raised in the Icelandic context, it has also been raised internationally. Thus, Richard Lewontin, a population geneticist, argued in an opinion piece, “People are not commodities,” in *The New York Times* (23 January 1999) that the database project amounted to the “selling of Icelandic DNA,” echoing claims about “biopiracy” popular in current debates on genetic research on indigenous groups.

Often the property issue has been discussed in the Icelandic context with reference or in comparison to ongoing debates about another thorny common property issue, namely the allocation of individual transferable quotas (ITQs) to rights in fish (on the latter, see, for instance, Pálsson and Helgason 1995). The Icelandic fishing industry has been radically reorganized in fifteen years or so with the application of market-based models to fisheries management. Critics argue that the current regime represents “the biggest theft in Icelandic history,” to use a frequent slogan from recent political campaigns, transferring wealth and property from the general public to a few privileged boat owners. Medical and genetic information, it is argued, are common pool resources analogous to the fishing stocks in Icelandic waters. Privileged access, permanent or temporary, as a result, should only be granted in return for a return-fee to ensure equity and fairness. While the Icelandic Parliament has emphasized that both resource-bases are public property and that privileged access is only temporarily, under some kind of arrangement of public trust, fees have only been applied in the case of the medical database. The text for the licence recently granted to deCode for constructing

the database specifies, partly in response to critics of the quota system in fishing, that the company must pay the Icelandic state a certain fee for the the assembly and use of the records of the medical service.

While there are some parallels between the quota issue and that of the database, there are important differences as well. For one thing, there are radically different histories and contexts. The combination of medical, genetic and genealogical information is not entirely new in the Icelandic context. Many researchers have done this in the past under the umbrellas of the Commission for Genetics (*Erfðafræðinefnd*), the Icelandic Cancer Society (*Krabbameinsfélagið*), and the Icelandic Heart Association (*Hjartavernd*). A central database, however, along the lines suggested by deCode, to be explicitly exploited for medical and commercial gain, is a new concept. Icelandic medical records, then, were fragmented and largely untapped in a commercial sense until deCode requested permission to link them to genetic and genealogical information; indeed, they still do not constitute a resource - a single database. The fishing stocks in Icelandic waters, in contrast, have been used for centuries by the public, usually on the basis of assumptions of common property. The common-property nature of the fishing stocks was recently reinforced in a famous decision by the Icelandic Supreme Court. In December 1998, the Court declared as unconstitutional existing fisheries laws on individual transferable quotas which privilege those who derive their fishing rights from ownership of vessels during a specific period (during which their “fishing history” was established). This privilege, the Court reasoned, violates both the constitutional rule against discrimination and the rule about the “right to work” (see Pálsson 1999).

Secondly, fishing stocks and medical information are different kinds of resource bases. Fishing stocks in most places are overused, sometimes by the logic of the so-called tragedy of the commons. In the case of medical records, in contrast, the escalation of “effort” does not threaten the “carrying capacity” of the resource. Although restrictions of access obviously limit the scope and capacity for prestige and financial gain, medical records, no matter how one exploits them, are renewable resources as long as the medical service operates. The case of the Icelandic medical database may represent an example of a tragedy of “anticommons” (Heller and Eisenberg 1998), in the sense that the resource in question may be *underused* as a result of too many “owners” blocking each other. As we have seen, territorial

resistance within the medical profession, *de facto* “owners” of medical records, may bar the construction of the central medical database.

The central medical database will only become useful as long as records from local clinics are passed on to the licensee responsible for their assembly. The Association of Icelandic Physicians has claimed from the beginning that the database would violate the relation of trust between physician and patient, since it operates on the basis of the principle of presumed (rather than informed) consent (people can refuse to be included in the database). Now, as the database is under construction, some directors of local clinics, who are also medical doctors, refuse to hand over “their” records, emphasizing their responsibility to their clients, pointing out that their patients have not consented to such a transfer of information about them. The main organized opposition to the database, the association *Mannvernd* (“The Association of Icelanders for Ethics in Science and Medicine,” or “The Humanitarians,” in literal translation), which is led by one of the medical doctors (Pétur Hauksson), supports the doctors’ refusal to hand over local records. Critics of the opposition, however, charge the medical doctors with “patronizing” their clients and “medicalizing” the issue of the database. Some patient groups complain that the doctors are not consulting the patients and that they have no right to make decisions about medical records on their behalf. In effect, they argue, the doctors are claiming ownership and control of information which properly belongs to the community, the Icelandic state which has financed their recording and assembly. While, presumably, the Ministry of Health is seeking a settlement on the issue, the matter has been taken up in Icelandic courts.

There are other intriguing legal developments in the database issue. Recently, a legal firm in Reykjavik has offered its service to people who want to claim their share in the anticipated profit from the database. The firm advises people to use their legal right to withdraw from the database by writing to the Ministry for Health, and then offer reentrance of information about them, collectively through the service of the firm; in other words, selling information about them for a given payment. Ironically, some of those who have objected to the database on ethical grounds, including the Association of Icelanders for Ethics in Science and Medicine, seem to support this initiative. The Ministry for Health, however, led by Minister Ingibjörg Pálmadóttir, has declared that such marketing of medical information would be both unethical and illegal. The Office of the National Surgeon, Sigurður Guðmundsson, agrees.

Genealogical records: In recent years, the study of genealogies has become a popular pastime in Iceland. While the fascination with family trees is a common Western theme (Bouquet 1996), in Iceland it is somewhat extreme, partly associated with family reunions and urban nostalgia for the rural past. The sheer wealth of records – “deep genealogy”, in deCode’s ambiguous rhetoric – is an important factor; there are reliable continuous genealogical records as far back as 1650, for some families all the way back to the time of settlement. Along with a computer company, Friðrik Skúlason, deCode is currently constructing a complete genealogical database, “The Book of Icelanders.” The database is expected to cover half of those ever born in Iceland, approximately 600 thousand names. Such a database not only provides an important historical dimension to the genome project, the search for mutant genes and the causes of diseases, it is also expected to be available on the worldwide web for genealogical enthusiasts and the general public. It will allow its users to check in a split second the genealogical connections between any two Icelanders.

Significantly, the genealogical database, unlike the medical database, has not raised fundamental ethical questions of privacy and consent. The property issue, on the other hand, has been contested. Recently, a new private company, Geneologium Islandorum, has challenged deCode and Friðrik Skúlason in the courts for using genealogical information earlier published by one of its owners and belonging to the company. The company claims that its property rights are being violated as others make profit by marketing the products of its earlier works. deCode has responded to the challenge by announcing that genealogical information about Icelanders constitutes a common heritage, the result of generations of scribes and collectors, and, as a result, deCode would be offering its genealogical program and database for free, in the public domain. The critical issue, under Icelandic law, does not seem to be the one of marketing but rather the extent to which the new electronic database is the result of original, independent work or the “reproduction” of earlier texts. Obviously, some element of “intertextuality” is unavoidable, given that the electronic database and earlier publications apply to the same population and that they are based on many of the same originals and earlier publications. deCode and Skúlason, however, have added extensively to earlier compilations by their independent research and, moreover, designed their own electronic format of storing and usage. The case of the genealogical records will be settled soon in the courts.

Icelandic, Anglo-American law and, no doubt, many other legal traditions, do not recognize property rights in human bodies. Generally people are not allowed to sell their organs or those of their relatives, although some body parts may be sold, including hair. Organs are typically exchanged within the framework of the gift (Gold 1996, Wilkinson and Garrard 1996). Biomedical information, however, does not fit easily into the legal tradition of the body (Greely 1998: 488). The question as to whether or not cell lines derived from surgically removed tissue constitute private property and, if so, who is the legal owner, is a contested one. Similarly, the issue of the human genome is legally complex and unsettled. While some policymaking bodies, including UNESCO, treat the human genome in a symbolic sense as the heritage of humanity, inviting the idea of international stewardship of the genome to avoid potential abuse, there is no legal foundation of such a “common heritage” concept. Indeed, an alternative approach emphasizing the “familial” nature of human genetic material seems to be gaining acceptance in Western societies despite the growing social and legal fragmentation of the family in the current age (Knoppers 1999: 23-4).

“Deep genealogy”

In general, the Icelandic public has supported the deCode project and the construction of the medical database. One sign is the strong positive response of the stock market. The general public support of the plan for the database has to be partly seen in the context of a specific local history, the nationalist discourse of Icelanders with its emphasis on sagas, the glories of the past, and the uniqueness of the Icelandic heritage, biological and cultural. It is pertinent to ask: To what extent are the Icelandic medical database and similar projects elsewhere (including Britain and Sweden) rooted in nationalist thought? Are they locked up in the eugenics of the early twentieth-century or are these completely separate moments or projects? Hilary Rose opts for the former, arguing (1999) that deCode “cannot escape the bleak history of early eugenics,” including compulsory sterilization, “because what the new genetics does is produce new eugenics.” This is a strong statement and needs careful scrutiny.

Finnbogason, one of the most influential native intellectuals of the first half of the twentieth century, invoked the “science of eugenics” to argue for the purification of the Icelandic race to preserve its spiritual and physical asset. Finnbogason wrote in glowing terms about the new movement of eugenics in Germany, England, the US and

Scandinavia, the ways in which it sought to improve the human race, and how Icelanders might benefit from it. While the “original race,” he suggested, was “exceptionally good” and, fortunately, Icelanders had largely avoided “mixing with foreign blood” (1922: 202), there were some signs of “racial pollution” (*kynspell*). Even worse, the law of natural selection might no longer be operating in modern society:

Previously, nature itself took care of racial hygiene. The weakest would die and only the fittest would survive. For a long time men would not forcefully resist this natural selection; often they employed themselves the same harsh method, practicing infanticide in the case of the weak, killing criminals, castrating vagabonds, and ignoring lunatics and idiots, and, as a result, such natural outcasts would only minimally reproduce themselves. Now humanism, medicine, and educational institutions preserve all of this as much as possible (Finnbogason 1922: 198).

Finnbogason further suggested (1943: 285) that some of the properties of modern Icelandic reflected an “Aryan” or “Viking” spirit.

These ideas were largely informed by the Euro-American genetic discourse that foreshadowed the racial hygiene of the Nazi regime. An Icelandic physical anthropologist, Eiður Kvaran, trained in Germany between the two World Wars, developed racial ideas along these lines to suggest that the literary heritage of Icelanders had a genetic basis (Kvaran 1936). Similar attitudes were expressed in German (and Italian) scholarly journals during the Second World War (see Newmeyer 1986: 37). Many accounts mixed aesthetics, genetics, and nation worship, trying to identify the characteristics of a particular language with the presumed physical and spiritual properties of its speakers.

The Icelandic eugenics movement was a strong one, a significant part of the nationalist revival between the world wars (Finnbogason 1922, Hannesson 1924, Kvaran 1936). Kvaran (1936) examined the ways in which the people of the saga age attempted to avoid racial “degeneration,” by infanticide, restrictions on marriage etc.. One commentator, Hannesson, a well-known medical doctor, added in an exceptionally favorable review of Kvaran’s work:

Now we *know* for sure that the way of thinking of the ancient past is in most respects correct and beneficial for a nation ... Now this issue receives great attention for most civilized nations, and it is even the core of the political thought of the Germans. Genetics has now provided full proof for most of the issues involved, but our ancient scripts have also provided guidelines in several respects (Hannesson 1937).

The nationalist discourse similarly emphasized the uniqueness and purity of the Icelandic language. Linguistic purism, which by approximately 1780 had become an established doctrine, became a useful ideological weapon for the nationalists who argued for independence from Denmark, emphasizing the literary heritage of Icelanders and the sagas. Not only did the sagas provide a symbol of national pride and unity, they also exemplified Icelandic language and heritage in their “purest” form. In the 1940s, new editions of the sagas using modernized Icelandic spelling caused heated debates in the country. Some of the leading intellectuals and politicians angrily asserted that modernized spelling violated the purity of Icelandic and the true spirit of the saga literature. Laxness, who was responsible for some of the new editions, was accused of “translating” the sagas to a new language, “the language spoken by the degraded part of the nation.” Generally, purism sought to revive “uncorrupted” Icelandic, to uproot Danish influence, and to modernize the Icelandic vocabulary. Finnbogason compared Icelandic to a great polluted river: “During periods of thawing many brooks have joined it from far away, carrying clay and mud, but they have never succeeded in polluting the deepest channels . . . gradually the dirt has sunk and disappeared” (Finnbogason 1971: 82-3). In recent decades Icelanders have not worried so much about the danger of corruption from abroad, although there has been some discussion during the last years of the growing influence of English.

Public discussion in Iceland of the medical database that is in the making obviously thrives on Icelandic nationalism. Many Icelanders seem proud of their “Nordic” roots and their genetic make-up, and they are eager to offer their blood samples and medical records to science and the advancement of human wellbeing. This should not, however, be confused with nationalism and eugenics. The Nazi regime emphasized the virtues of bodily hygiene, gymnastics and the dangers of smoking, but

it would be silly to argue that modern fascination with aerobics and the resistance to smoking had anything to do with eugenics. Moreover, while all genetic disease studies have a eugenic dimension, since their aim is to eradicate or neutralize particular genetic disorders, there are important differences between eugenics and the new genetics. The difference (although maybe not entirely clear-cut) is that the former was based on preventing procreation of those deemed to have “undesirable” qualities, whereas the latter seeks to eliminate undesirable qualities (defined more restrictively - i.e. as “diseases”) through a different means, without inhibiting procreation. There are important similarities (elimination of undesirable qualities), then, but equally important differences (more restricted definition of undesirable qualities and very different methods). The new modes of reasoning or “genetic imaginations” (Glasner and Rothman 1998) made possible by the mapping of the human genome do not suggest a eugenic movement, indeed it is difficult to see why they should follow a predetermined, linear path.

Moral landscapes

Some of the biotechnological developments outlined above are transnational and occurring at an exponential rate. Because for us the body is both the locus and agent of our experience (Csordas 1994), it is often represented as “sacred space” resisting invasions, extraction, and commodification (Campbell 1992, Marshall *et al.* 1996). The arrival in human prehistory of the practice of burying the dead was not trivial; it had profound evolutionary significance, underlining the notion of the integrity of the body and the “quasi-property” rights of relatives in the corpse of the deceased. However, while humans everywhere and at all times tend to resist the alienation and marketing of body parts, responses to the commodification of bodily components exhibit considerable cultural and historical diversity. Attitudes towards the human body and its marketing vary widely and for a variety of reasons. These differences can be observed at different levels, nationally, ethnically, and locally, as well as internationally.

One point of difference in the discourse on the human body is the extent to which it is morally “right” or “permissible” to remove, reproduce, and market as commodities components of the body (including blood, seel lines, clones). Although in each and every context, a clear distinction is made between the permissible and unethical, the line separating the two seems to vary from one context to another. The

consequences, then, of the realignment of the market and the bodily domain vary widely according to the different social, religious, and political character of the contexts involved (Clarke and Parsons 1997). There are noticeable differences across the globe - between, for instance, Europe, Japan, and the United States - in attitudes towards bodily components, the consumption of biotechnological products, and its moral values.

There are, broadly speaking, three ways of understanding modern biotechnology and the marketing of its products. The first, represented by the approach of neo-classical economics, is the two-dimensional landscape of supply and demand, two-dimensional in the sense that moral issues are deliberately ignored (see, for instance, Sen 1987). As Joralemon points out (1995: 345), proponents of property rights ideology “even revel in” the fact that their suggestions to apply the neo-classical approach to bodily commodities are frequently met with repugnance, seeing themselves as the vanguards of reason against “shibboleth and shamanism” (Blumstein, quoted in Joralemon 1995). In this approach, the actor is driven by a compulsion to extend, as far as possible, the valuation of all things according to a universally commensurate monetary standard - thereby unearthing the “natural economy,” where the true benevolent nature of *Homo oeconomicus* can unfold. In this conception, money plays the role of the ultimate mediator and translator of values, promoting freedom of choice, and providing incentive for further commoditisation and division of labor. By ignoring social context and the validity of hostility to the process of commoditisation, standard neo-classical economic theory is effectively ruled out from having much to contribute to a study of differing responses to biotechnological and market innovations. For some people, somatic commoditisation is inhumane and degrading, an offence against personhood and dignity, but for others it represents a humanitarian effort in that it increases the supply of body parts and, therefore, saves lives and reduces human misery. Significantly, the notion of human organic materials as commodities is more problematic in some cases than in others.

The second approach is that of bioethics. In this case, the ethical dimension *is* included as a central one. However, it is usually essentialist and uniform, much like the universal monetary standard of neo-classical economics, based as it is on the ethnocentric yardsticks of classical Western philosophy (Pálsson and Rabinow 1999). Most philosophically-trained bioethicists, as Kleinman observes (1995: 46), draw upon

“the orthodox sources of the self in Western philosophical tradition,” emphasizing the autonomy of the person, partly in an attempt at balancing the interests of individual and society. The ethical dimension, then, in a sense, is simply added as a separate two-dimensional layer on top of the neo-classical one. Debates about the commoditisation of bodily components take place in a living social environment. It is the protagonists and consumers of these debates, with their diverse range of perspectives, values and interests that weave the moral strands that result in legislation and the formation of tradition. Bioethicists are but one voice among many who attempt to understand and influence the course of this process. However, their efforts are usually not based on empirical research, and therefore their analysis of the issues of debate can only partially encompass the differences of values, interests and perspectives of those whose actions directly and indirectly shape the debate and its outcome.

A more comprehensive understanding of debates about the new biological commodities needs to be based on an empirical approach. The metaphor of landscape can be a useful tool to make sense of the complexities involved. Thus, in contrast to the flat and homogeneous moral environment presupposed by neo-classical economic thought, and the somewhat rigid preconceptions of the theory imposed by bioethical philosophers, the moral environment can be likened to a dynamic three-dimensional topography, intersected by pathways, boundaries and spheres (Hirsch and O’Hanlon 1995). The occurrence of biotechnological innovation and commoditisation, and the resultant processes that take place as such changes are negotiated and debated in the social environment, can thus be viewed as periods of upheaval and formation as boundaries are erected or leveled and new pathways of exchange are created or blocked. It is the values, ideas and interests that motivate such changes to the topography of the moral economy that thus become the focus of attention. The advantage of this view is that it both expands the economy as an anthropological object of study and allows for a heterogeneous and realistic situation in which different forms of exchange with a diverse array of things co-existing and interacting in the same social universe (Helgason and Pálsson 1997). While the use of spatial metaphors is by no means essential to the study of exchange, it presents a useful way of conceptualizing the contrasts, similarities and interactions of different forms of exchange. Comparative research on people’s responses to the development of biotechnology and the moral landscape which they constitute provides a better

understanding of the market and the economic system in question as well as the options available for informing decisions and regulating production and consumption.

The exponential growth in biotechnology and the expansion of market exchange with bodily commodities have left little time to evaluate the moral, legal, cultural, and social implications of these radical changes. It is clear that biotechnological advances invite new kinds of social and moral dilemmas, ones that may require the rethinking of existing conceptual frameworks. Contemporary anthropology consistently finds itself confronted with complex moral landscapes. Traditionally anthropologists have prided themselves on suspending ethical judgment until late in (or after) fieldwork: ideally, anthropologists have attempted to “get it right” before passing judgment on others’ practices (a moment that often never arrived). When anthropology was most concerned with combating ethnocentrism, it seemed to be necessary to avoid any premature judgment in advance. Such neutrality, informed by a profound ethical premise of the worth of all cultures, has been held to be necessary to carry out fieldwork at all. And surely we need to be reasonably open to the exotic and the unknown; if we think we know all the answers in advance, what would be the point in doing fieldwork? A critical step for tackling ethical problems associated with modern biotechnology is to adopt an empirical approach, an approach that focuses on the social and cultural contexts into which new forms of biotechnology are introduced and the actual practices, reactions and concerns of scientists, policy makers and the public in different settings. One of the central contributions of anthropology to such issues is to explore how and why people moralise and why the responses may differ from one context to another.

Discussion

The successes of molecular biology have partly resulted in what Keller (1995) identifies as “discourse of gene action,” the notion that the “blueprints” of life are encoded in DNA molecules and genomes. Significantly, however, another scholarly discourse has recently emerged which underlines the unity of genes, organisms, and environment – the importance of mutual interactions: “a new way of talking is in the air, in keeping with the emergence of a new biology: molecular biologists, it appears, have ‘discovered the organism’” (Keller 1995: 29). Biological thought, then, is not as single-stranded as one might expect (Descola and Pálsson 1996). It remains to be seen

how the theoretical contest between genetic determinists and contextualists unfolds. More importantly, perhaps, how these theoretical ideas relate to ideologies is a matter of social context.

The folk discourse on genetics currently popular in Iceland and most other Western countries, the discourse that reduces many aspects of human behavior (as diverse aspects as alcoholism, gay culture, violence, and the ability to play chess) to the action of specific genes, obviously draws upon technical and conceptual developments in biotechnology. Given the social context – a context characterized by, say, unemployment and a prior history of ethnic conflict and racist thought - modern biological and genetic theory can easily serve as the rationale for local eugenic regimes. There is no inevitable connection, however. The task remains for social scientists to monitor ongoing developments in biotechnology and the ways in which they inform, reflect, or interact with social context. And this includes spelling out what may be termed, paraphrasing Sperber (1993), the “epidemiology” of eugenics, outlining both the kinds of historical conditions that help to explain why eugenic ideas may become “contagious” (to continue the metaphor) and the social “antibodies” that may prevent their spread and attack.

The debate about the Icelandic medical database, deCode, and similar phenomena elsewhere focuses on the use and control of traditional forms of information – medical records, tissue, geneologies - which have not been controversial in the past. While the concerns with capital, national sovereignty, and property rights are evident in the tension in the current Icelandic debate between the political left and right, between neo-communitarians and advocates of common pool arrangements, on the one hand, and, on the other, adherents of private property and the free market, the lines of political division around the database issue are neither so clear nor simple. In many areas of intellectual property, including biomedicine, there are tradeoffs between the promises of privatization and patenting, on the one hand, and, on the other, the risks of anticommons. The Icelandic property debate above all reveals concerns about potentially dramatic changes in the practices and structures of Icelandic bioscience and medicine. Some academics have alleged that restrictions of access to information and resources implied in the privileged contract of deCode with the Icelandic state will inevitably result in the stagnation of bioscience. deCode, they claim, will restrict access to medical data, although theoretically access will be free to independent researchers as

long as they only work with data that will not violate the commercial interests of deCode. deCode argues that the database will make possible much more research in Iceland and that many new positions will be created for research both within the company and at the University of Iceland. Those in favour of the database also observe that Icelandic physicians opposing the database are partly motivated by “professional” concerns with territorial control and that the authority of the medical establishment remains too strong. There is a significant gap, they point out, between current bioscientific and medical practices in Iceland (the practices of many of deCode’s main opponents) and the types of protection of privacy and provisions for informed consent appropriately demanded for deCode.

The metaphor of comedy has been used by several scholars (including Rose 1994) to draw attention to the potential of collective action in common property regimes. McCay suggests (1995) that while such a metaphor captures the narrative style of economic approaches to the question of the commons informed by game theory, the comic plot is still “squarely modernist” (McCay 1995: 109) in the sense that it fails to seriously address the larger contexts of history, power, and culture. The metaphor of *romance*, she argues, may be a more realistic literary metaphor, allowing for some degree of future hope, in a world with contesting perspectives, conflicting interests, and unexpected turns. In romance, as McCay suggests, “conflict drives the narrative and is not overcome in the manner of neoclassical analyses. ... Romance implies ... complex development of character, situation, and plot and hinges upon the tension of not knowing what the outcome will be, but hoping for the best” (1995: 110). Perhaps, paraphrasing McCay one can speak of the romance of a complex constellation of commons and anticommons in the biotechnological domain, as key contestants in the legal debate about the control of information – the individual citizen (the family), the private sector (biomedical companies), the medical profession, and the national state – negotiate and establish new property regimes.

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