

Amalgamations

Fusing Technology and Culture

Edited by
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Xenotransplantation

Biotechnology and the Reinterpretation of Nature

Susanne Lundin

Like the transuranic elements, transgenic creatures, which carry genes from 'unrelated' organisms, simultaneously fit into well established taxonomic and evolutionary discourses and shatter widely understood senses of natural limit. What was distant and unrelated becomes intimate (Haraway 1997:56)

At a press conference some ten years ago, the world-famous transplant surgeon Thomas Starzl was asked whether it would be possible in the near future to replace not just one but several vital organs in one person. Starzl replied that puzzle people like this already existed; people who had received transplants of a heart and a liver, or a pancreas and a kidney, or a heart together with new lungs. He declared that other, much more complicated, combinations would soon be here (Starzl 1992).

All over the world, sick people are queuing for new organs. Transplants from animals – xenotransplants – are one way to find an answer to this ever-growing need. These advanced biotechnological methods open a number of medical possibilities. At the same time, both ethical and epistemological questions arise about the links between technology, the body, and identity. It was from issues like these that Paul Rabinow's (1992) discussion of *biosociality* emerged; the process by which nature and culture are given new meanings. The *cyborgs*, Donna Haraway's (1991) figure of thought, has a similar origin. It is a metaphor of how advanced technology intervenes in people's lives – whether as a product of genetic engineering, as mechanical implants such as pacemakers, or in the form of transplanted animal organs.

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These medical processes tend to be described as boundary-transcending. In fact they should rather be characterized in terms of boundlessness.¹ Although genetics itself is based on natural laws and reveals predetermined destinies, technology can break this order and change both biology and culture. It is this interplay between fixed and dissolved boundaries, between the familiar and the alien, that is the starting point for my discussion.

The article is based on an interview study with people suffering from diabetes and Parkinson's disease.² The former have been given porcine islets, insulin-producing cells from pigs, while the others have had human fetal cells transplanted into the brain and are also potential recipients of xenotransplants.³ My interest is focused on how these people handle a situation which means that the disease afflicting them has to be controlled by medical high technology, using hitherto unknown and untested operations such as transplants with modified animal organs.

We may wonder whether these developments lead to new attitudes to the individual and the body: ideas about what is genuinely human or inhuman, what is nature and what is culture.⁴ What does it mean, for example, as Thomas Starzl (1992) puts it, to be a biological and technical puzzle? Or how does it feel to live with body parts that have come from other people, or even from animals? Is the unknown incorporated, or is the body regarded with a new and uncertain gaze?

Rejection

It is not long since donations involving the transfer of organs from one human body to another – allotransplants – were highly controversial. Today allotransplants are a matter of course in medicine, having saved the lives of tens of thousands of patients, especially since it is now possible to restrain the dramatic reaction of the immune system.

On the cultural level, too, transplants seem to give rise to both rejection and integration of the unknown. In the debates about how growing medical knowledge is to be used, it is often this question of opportunities versus risks that calls for an answer: can these trans-

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plants mean the transfer of viruses that are harmless to animals but lethal to human beings?⁵ Is it right to use animals as biological reserves for humanity (Singer 1977; Wheale and McNally 1995)? Further, what will the consequences for human beings be? In other words, how many foreign substances can be introduced into the body before the uniquely personal qualities and humanity vanish?

My informants are well acquainted with the issues surrounding transplantation in general and are also aware that transplants of both human fetal cells and porcine cells are controversial. They also know that there is debate about transgenic pigs, genetically modified animals. Their own view of xenotransplants and transgenic organs, however, is favorable. They show a highly pragmatic stance, with their own survival taking precedence over any ethical or existential misgivings (Lundin 1998).⁶ Birgit, a diabetic, says: 'I think I could do anything, because I don't want to die. That's the last thing I want.' At the same time, she and other informants have feelings of hesitation and reflect on whether the transplants could give rise to unknown side effects. Birgit expresses her fear of the unforeseeable medical risks:

The animal organ must be cleaned and sterilized and everything, and if it is I don't think you can say no. I mean, I would have to have guarantees that there is no infection, that no animal virus can be transferred to people this way.

Yet, parallel to these visions of biological threats, my informants sense other dangers which are not just about side effects that break down the body, but rather about existential and ontological insecurity. When one's own bodily substance is inhabited by foreign matter, a special boundary is transgressed; in this movement, not only the frames of the body are exploded but also established cultural categories for what is truly human.

Studies of transplantation involving human donors indicate that some recipients ruminate over whether something more than biological substances may accompany transplanted cells and organs (cf. Youngner et al. 1996). They are of the opinion that 'there are invisible links between people.' The concept of cell memory is

crucial here, a term originally used in immunology to describe how our bodies 'remember' a special antigen for decades after a vaccination. A cell memory like this, as both transplant recipients and some scientists argue, can also contain a donor's thoughts and feelings (Chopra 1993).

Xenotransplants challenge this kind of view in a very special way. My informants who have received transplants of animal substances do not speak about the cell memory of the body, which may be because none of them has studied medical terminology in any depth. Yet most of them assume that a biological memory function exists, and nourish ideas that the animal cells could contain something that is not just a matter of the production of insulin or virus diseases. Another woman, Karin, says that, when her kidney ceased to function and she was given her brother's, this was 'a gift of God that the whole family supported me with.' Reactions to the treatment with porcine islets were not as positive; for instance, her teenage daughter was dubious about xenotransplantation since 'she thought it was a bit disgusting; pigs are filthy animals and you can't have that in your body'; as if the dirt of the pig could be transplanted to the mother. Karin herself feels that the porcine islets, the pig cells, are not problematic:

The cells feel okay, for there's nothing there. I could conceive of getting a pig's kidney too. But if it was a pig's heart ... I don't know. For somehow the personality is in the heart. So with a pig, well, it would be repulsive.

Similar thoughts were expressed by the wife of a man with Parkinson's disease. A team of American doctors in Boston operated porcine fetal cells into the man's brain; the wife was in favor of the operation but admitted amidst tearful laughter that as a Jew she found it repugnant that her husband had a pig in his body.⁷

The Baby Fae case in the USA, when a newborn girl received a baboon heart in 1984, aroused strong feelings. The child survived for twenty days, during which time there was a massive protest action, with messages such as 'Mixing human and animals protein is just bad science.' Baby Fae's mother said in a television interview that she too

wondered how her daughter would be affected by having an animal organ in her body.⁸ We glimpse similar thoughts in a television interview with the diabetic Doreen Hackney. In connection with the first transgenic organ transplant that was to be undertaken in England in 1996, but that was then stopped when the Nuffield Council on Bioethics had examined the case, a number of potential patients were asked what they thought. Doreen Hackney was one of them. 'No, I don't want a pig's kidney,' she said, 'I wouldn't feel safe. I'd rather die than live half-human and half-animal.'⁹

There is obviously an insecurity here, which seems to be based on ideas of the wholeness of the body, despite the Cartesian influence of our times, whereby body and soul are regarded as separate. Opinions vary, however, as regards where exactly in the body the transferred characteristics are located.¹⁰ Some people, like Karin above, believe that the heart is the location. Others point to the eyes or the brain as the central seat of identity. A man who has had fetal cells transplanted in his brain because of Parkinson's disease says:

The personality is definitely in the brain. But it's the size that matters. If you supplement an existing brain with – as in my case – a very small amount of new cells from another person or from a pig or whatever, I don't think that upsets my concepts of the link between the brain and the individual. But if we were talking about replacing half of the cerebrum, then we're getting closer to more sensitive matters. Then you'd be replacing a large part of the individual's personality.

It is evident that not just the location of the transplant but also its size makes a difference. It is clear that the act of drawing the boundary is a negotiable and hence also a problematic concern. In my conversations with diabetics who have received porcine cells, several people, such as Karin above, admitted to some initial doubt about receiving organs from animals; they were described as 'unpleasantly animal, meaty, and big.' The cells, on the other hand, 'definitely did not feel like organs, they were like a liquid that was sucked up and disappeared into the body.'

Gradually, however, there was a reappraisal of organs and cells. The well delimited organs, which were at first perceived as threat-

ening, through time were felt to be manageable. But where the cells were now was a matter of doubt.¹¹ One woman put it like this:

With a kidney, you know where it is. But cells, they're so small and can't be seen. I don't really know where they have got to, and that feels odd.

It seems as if this lack of control generates anxiety. A sense of something uncontrollable – in both medical and 'spiritual' terms – has been released. The situation is evidently perceived as threatening in a dual sense. It is not just through external actions in the form of transplant operations that risks can arise; they can also be triggered in totally different ways. In fact, with the aid of medicine, genes, cells, or organs are introduced which may contain unknown components that are activated by integration with one's own body. There has been a shift here from the surface to the interior, which means that it is inside the body that the uncertainty lies.

The idea that the unknown is concealed in the body is a notion that my informants share with many people in today's biomedical society (cf. Martin 1994), but the interior of the body as a specific risk field is particularly clear in people who undergo various biomedical interventions.

Xenotransplants are evidently perceived as dubious therapies, since they mix categories that should be kept separate – humans and animals. Both medical and cultural/ontological arguments, such as anxiety about viruses, or the fear of losing one's personal identity, are used here. Transgenic transplants, in which the animal organ bears human DNA, cause even greater worry. Transgenetics uses microbiological units which are designed to suit humans. Because of these genetically modified products – these imitations of the natural, which blend animal, human, and technological – yet another link with what is biologically genuine has been cut. In this connection, the bodies of transplant recipients are a boundless arena, a cyborgian incorporation of human, animal, and technology (cf. Haraway 1997). These ideas about body and identity are encapsulated in one informant's speculation about 'how many genes you can change before you are changed as a human being.'

Ambivalence

In my informants' statements we often meet reflections on whether there are natural boundaries that should not be transgressed. Thoughts like these are tested on another, more structural level, for example, in fiction of various kinds. There are stories with deep historical roots about hybrids arising from mixtures of human and inhuman.¹²

These reflections about the dissolution of boundaries between species contain tenacious normative ideas about nature and culture. On the concrete everyday level, however, there are transformations of the view of what is natural or unnatural, cultural shifts of the link between body and identity. People's doubts about these boundary transgressions are increasingly countered by expert explanations of genetic facts. These presentations are not darkened by any doubts. Instead, they emphasize the great similarities that exist between the genetic makeup of different species; overstepping species boundaries is sometimes described as if it were one of the more obvious processes in evolution.

Cultural recharging of this kind is one of many parallel processes in which the 'unnaturally' alien is integrated in a meaningful context. The media in particular put this message across, permeating people's general awareness. For example, newspapers and television have pedagogical illustrations of DNA spirals showing the striking genetic agreement (95 per cent) between apes and humans, between pigs and humans (85 per cent), and even between humans and fish (80 per cent), insects, and other so-called lower creatures. An effective device is to demonstrate the development of an embryo in a sequence of pictures: what people at first believe to be a human baby turns out to be a pig or a bird.

Presentations like these make it clear that man is just a small link in nature's chain. From this point of view, the idea of using gene technology to bring these species closer to each other does not encounter any obstacle; it is instead seen as a way to help nature along, bringing together things that belong together. This is an argument that my informants like to bring up. One woman, when reasoning about treating Parkinson's disease with fetal

cells from transgenic pigs, puts it this way: 'Putting an animal in the brain is a bit poetic in a way, I think.' Other informants emphasize:

We must take nature seriously and have respect for all of us who are part of it. Nature is like a gigantic cycle – give and take, eat or be eaten, that's what it's about. ... So, getting animal organs is all right, I think.

Receiving a transplant of an animal organ can appear sensible from this principle of equality. At the same time, it is perhaps this generic similarity that terrifies people. Receiving a transplant of an animal organ may seem sensible in view of this similarity, yet it may provoke a slight sense of discomfort if one is too close to the animal one wants to use.¹³ There is even the worrying idea that biotechnology can be used to produce a whole new kinship system, a boundless family with increasingly close blood ties between humans and animals, so that in the end man is nothing but one animal among many others (cf. Löfgren 1985). As one of my informants puts this: 'well, I don't know about eating ham sandwiches, you never know if it's your kin you have in the sandwich.' One of the scientists at the 'pig farm' at the Babraham Institute in England is more outspoken: 'Look out, you might end up as a pig!'

Integration

Knowledge of nature evidently engenders several interpretations of reality, constructed figures of thought in which similarity may be as unshakable as differences. Genetic facts thus give different understandings of the links between biology and technology. It is in – often contradictory – learning processes like these that people assimilate various kinds of 'truth', with negotiations about how to draw the boundary between what is genuinely human and what is not genuine, what is natural and what is not natural. Listen, for example, to what my informant Karin had to say when I told her about one of my earlier studies dealing with IVF (Lundin 1996, 1997):

I think there's a difference. Although there isn't really, since it all concerns the body. But it feels as if there's a difference between IVF and xenotransplants. I mean, if you can't have children, maybe you're not meant to. But with a sick kidney ... you die.

It is clear that this patient, who has received a kidney transplant, creates her own priority scale for what is defensible and not defensible. In this hierarchy, kidney diseases requiring xenotransplantations are at the top since they can lead to death, whereas childlessness is 'not dangerous and is in fact a natural phenomenon that should not be rectified.'

This subjective ranking not only sets up a standard for what is ethically defensible. We also discern here a reinterpretation of nature and culture – of life and death – which rests upon a special awareness of the potential of technology (cf. Bauman 1993). The insight that biomedicine can give dying people a new lease on life makes natural death appear unnecessary, almost unnatural, a phenomenon requiring artificial measures to regain its naturalness. Rationalizations of this kind detechnologize biomedical interventions, giving them instead the role of nature's handmaid. Paul Rabinow's concept of biosociality seeks to explain this recharging of nature and culture, a state in which 'Nature will be known and remade through technique and will finally become artificial, just as culture becomes natural' (Rabinow 1992:241–242).

Many recipients of xenotransplants, and those waiting for such surgical operations, accomplish a symbolic reevaluation. What was initially seen with skepticism, the idea that the technically modified spare parts could weaken true humanity, is reformulated. Instead of drawing parallels between animal and inhuman, human bodies harboring animal organisms appeared desirable. In this connection it is tempting to go back to the words of the scientist quoted above – 'Look out, you might end up as a pig' – and reword them as 'Transgenic pigs lead to health, to perfection.' Thus, to refer to Paul Rabinow (1992), nature is reshaped into something unnatural while culturally created technology is seen as something pure and genuine.

As medical interventions develop, not only are people's bodies

transformed when they are filled with foreign organisms; their view of what is a natural body also changes. This ability to reinterpret and renegotiate all the time is one of the characteristics of modernity and biosociety, where flexible individuals are shaped, people whose personality and identity are changed, at the same time as a specific sense of the self is retained. Living in this tension between mobility and stability, in the space of boundlessness, is what is required of people today. 'A playing self' is what Alberto Melucci (1996) calls this learning process, which makes it possible to renegotiate seemingly fixed boundaries, to cross them without difficulty, or even to erase them. In this game there are constant cultural agreements about what is a genuine and natural human being.

Notes

- 1 Maguire and McGee (1999) discuss how bioelectronics combines advances in prosthetic technology and computer science in, for example, pacemaker-like brain implants to help Parkinson's patients, but also how researchers are developing 'second brains' (1999:8–9) linked to Internet-connected computer systems. Maguire and McGee state that such technological creations blur the boundaries between the real and the virtual and have far-reaching consequences: 'A consciousness wired to the collective and the accumulated knowledge of mankind will surely transform the individual's sense of self' (1999:12).
- 2 The study is based on two interdisciplinary projects: (1) 'Genetics, Genetic Engineering, and Everyday Ethics,' directed by Lynn Akesson and myself, in which ethnologists at Lund University are collaborating with doctors and geneticists; (2) 'Cultural Perspectives on Xenotransplantation,' which I am directing as part of a national medical project on diabetes and xenotransplants, 'Treatment of Diabetes by Transplantation of Porcine Islets' (financed by the Juvenile Diabetes Foundation and the Swedish Medical Research Council).
- 3 Since 1987, seventeen people have received transplants of human fetal cells at Lund University Hospital. My informants belong to this group. A total of a hundred people around the world have had this operation. The method presupposes access to aborted fetuses, which is both an ethical and a practical problem. Xenotransplants, with brain cells from porcine fetuses, are being developed as an alternative. Only a few such transplants have been done hitherto. My other group of informants, the diabetics, have all undergone xenotransplants at Huddinge Hospital. Ten diabetics received transplants of porcine islets between 1990 and 1993, a method that was unique in the world at that time.
- 4 I have shown, for example in my previous research into *in vitro* fertilization, that people's self-understanding and patterns of values can be changed in connection with biomedical interventions (Lundin 1996, 1997).

- 5 In recent years the virus problem has become an impending threat. It turns out that pathogenic micro-organisms, 'retroviruses', can be spread from animals to their human hosts (Tibell et al. 1994; Groth et al. 1997).
- 6 This ambivalence is significant for people's perception of the new medical technology. My informants' narratives are permeated by precisely this ambiguity in which two main positions are clear: a personal morality and a general societal ethics. This ambivalent attitude makes it difficult to find unambiguous answers and indicates the necessity of a many-sided analysis. In the last few years there have been a number of studies trying to capture the complexity of these issues by analyzing the attitudes of the general public. It has been shown that increased knowledge of gene technology tends to create a negative attitude, while people in countries where little information is given have a greater faith in medical technology (cf. Fjæstad 1997; Hviid Nielsen 1997; also the SIFO opinion survey initiated by Uddenberg and Bråkenhielm (1997). Reinterviewing affected people is a way to analyze people's often contradictory interpretations and actions. Cf. Mohaci 1995; Strathern 1997; Persson 1998; Wélin and Persson 1999.
- 7 *Panorama*, 'Animal Transplants,' BBC 1, June 1996. It should be added that, like all outlooks on life, these issues are culture-specific. The Jewish woman contrasts the treatment with porcine islets with her religion which prohibits eating pork, while Yvonne's daughter above transfers the fifth of the piggy to the transplant. The reluctance to integrate impurities in the body is well attested in ethnological and anthropological literature. The sense of discomfort felt by these people can be explained in part against this background. Above all, however, an analysis should start with ideas about nature and culture, about what is biologically and culturally authentic, and what is truly human.
- 8 *Panorama*, 'Animal Transplants,' BBC 1, June 1996.
- 9 *Panorama*, 'Animal Transplants,' BBC 1, June 1996. As I have discussed in studies on IVF, there are similar thoughts about transgressing bodily boundaries in cases of egg and sperm donation (Lundin 1996, 1997). The criticism is not directed against overstepping species boundaries, but against the possibility that completely new constellations of kinship may arise. For example, can one marry a sibling produced by the same donor's egg or sperm? Can genes commit incest? Cf. Edwards et al. 1993.
- 10 For many people, donations mean that a dead body is given the personality of a stranger, as Lynn Akesson (1997:35) puts it. Cf. Sachs 1998; Sanner 1994:1141-1152.
- 11 Cf. Virilio (1996), who describes how a person with a transplanted liver feels the movement of the organ in the body, as if it was whirling round by means of 'internal gravity'; there are interesting parallels here between body perception and societal patterns.
- 12 Monsters – half-human, half-animal – are said to have been born as a result of bestiality; other monsters are blends of human and artificial, as in Frankenstein's well-known monster. Common motifs nowadays are organ transplants of various kinds, as in the film *Body Parts* from 1988 (Ideland 1997). Older motifs are found in the world of folk tales. There is the story, for instance, of the three doctors who wanted to show off their professional skill. One of them removed a hand, one an

eye, and one the stomach, the idea being that they should put the organs back in place the following day. Of course, the organs disappear during the night. The maid and manservant who had failed in their duty of guarding the organs found a way out. They got a new hand from a beheaded thief, an eye from a cat, and a stomach from a pig. When the unsuspecting doctors had put the organs back into place, they acquired the characteristics of the former owners. The thief's hand stole things, the cat's eye was always on the watch, and the pig's stomach ate everything it came across.

- 13 Sarah Franklin (1997) points out that biotechnology creates specific bonds – not of kinship but at least of solidarity – to technology and science. See also Haraway 1997.

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