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Kaori Sasaki

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Bioethics between Imaginary and Reality: Tracing Science Fiction and Its Shaping of Transplant Medicine Protocols in Japan

Kaori Sasaki

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Abstract By extending the late Osamu Kanamori's notion of science fiction (sci-fi) as it "re-articulate[s] various issues that bioethical studies had formally discussed," this paper provides a cultural analysis of Japanese sci-fi stories from the 1990s with reference to the exchange of body parts. By focusing on the time when organ transplantation from brain-dead donors was part of many intensive debates, this paper pays particular attention to the fictional representations of humanity, which feature body-part exchanges between the living and the dead, in genres ranging from Noh 能 dramas to manga 漫画. In this paper I shed light on two issues: (1) how sci-fi representations described the matter of humanity vis-à-vis exchanging parts of the body, and (2) in what ways and on what terms bioethical discourses relating to Japanese organ transplant medicine from brain-dead donors were rearticulated through these sci-fi narratives. I also argue that such rearticulated values were inscribed in the process of constructing the bioethical code of practice in transplant medicine and deathbed care that took place during the late 1990s. By doing so, this paper confirms the role that sci-fi plays in bioethical imaginations, as Kanamori has pointed out and as can also be seen in East Asian societies like Japan.

Keywords organ transplantation · science fiction · Japan · brain death · representation · gift economy · tradition · culture

1 Introduction

The late Professor Osamu Kanamori (金森修), one of the leading philosophers of science and technology in Japan, was a significant player in the encounter of two subdisciplines. Science and technology studies (STS) has progressed into a solid academic discipline throughout East Asia. Japan is no exception. Following its introduction to Japan in the late 1990s, a number of scholars began to apply the Euro-American

K. Sasaki

Center for Language and Center for Glocal Strategy, Otaru University of Commerce, Japan
e-mail: k-sasaki@res.otaru-uc.ac.jp

STS discipline to their inquiries. At the same time, some researchers in established areas such as the philosophy of science and technology, history of science, and sociology of health and illness extended the scope of their own studies to participate in STS. Subsequently, the two groups cultivated their own academic fields further: while some researchers in the more established fields respected the work of the STS scholars and others concentrated on catching up with the then current trend of Japanese media and academia and Euro-American STS, certain members of both groups engaged in a joint effort to establish the STS discipline. Japan's STS has arguably been formed out of these scholars' efforts and activities during the 2000s.¹

While Kanamori's interest in science and technologies was wide-ranging (see Okumura and Suzuki's summary in this issue), during the 2000s his attention was drawn to bioethics and organ transplantation. Against a backdrop of criticism of the Japanese policy for organ transplantation from brain-dead donors of the time, he became a participant in public controversies concerning the role of bioethics in this area.² Although his academic papers on this issue are few, his 2013 article "Kyoko ni shoshyasareru seimeirinri" 虚構に照射される生命倫理 ("Bioethics, Illuminated by Fictional Stories") is representative and, consequently, offers insight into his arguments on this matter.

According to this article (Kanamori 2013), bioethical considerations were originally expected to expand the scope of existing academic disciplines, including philosophy, law, and medicine. They enabled bioethics to cast light on philosophical, ethical, and social problems arising from the development of science, technology, and medicine. However, once bioethics was founded as a formal academic subject, Kanamori argued that its scope became too fixed to offer critical and novel insight. Kanamori accordingly examined a number of science fiction (sci-fi) stories as an attempt to identify alternative approaches that might maintain the ambition originally found in bioethics, arguing for the high "potential of sci-fi" imaginations in light of bioethical considerations. In other words, sci-fi stories can offer constructive criticism on the nature of medical practices. The stories are, in Kanamori's own words, "re-articulating various issues that bioethical studies had formally discussed" (Kanamori 2013: 4). A significant body of research (e.g., Chan 2009; Gurnham 2012; Chambers 2016; Mirenayat et al. 2017) has examined the role of Anglo-American sci-fi stories vis-à-vis bioethics.

In the Japanese context, as I have previously demonstrated (Sasaki 2006a), sci-fi narratives played a key role in formulating and circulating social attitudes toward bioethics. By projecting particular views onto events within sci-fi plots, this genre mapped out issues arising from advances in science and technology; subsequently such views and/or issues were molded into major bioethical topics in Japan. Their wide recognition, Kanamori argued, led to the migration of some fictional figures and storylines into the "factually existing" medical and/or bioethical model within Japanese "cultural history" (Kanamori 2013: 4). In Kanamori's view, the Japanese sci-fi imagination became embedded in the development of bioethical perceptions, social trends, and cultural values.

¹ Tsukahara (2016), for instance, provides critical reflection over this development process.

² See, for instance, Kanamori's participation, with other prominent Japanese scholars, in a press conference held on 12 May 2011 with regard to STS and bioethics; it was intended to criticize the amendment of the Organ Transplantation Act 1997 to the Act of 2011.

Kanamori (2013) thus argued for the high potential of sci-fi in terms of influencing public perceptions in Japan and more widely in terms of rearticulating bioethical issues worldwide. Given the unique Japanese socio-cultural-political environment of the early 2000s, his argument could have specific significance in Japanese STS, particularly with regard to studies of sci-fi representations vis-à-vis science communication.

By contrasting the discussion of the interaction of sci-fi and society in North and South Korea (Kim 2018), it has been argued that the Japanese sci-fi genre developed alongside public understanding of science and technologies, citizen science, and science communication, particularly regarding robots and nuclear power. Carl K. Li (2016), for example, illustrated the exceptional role of sci-fi within Japanese society as it articulates sociopolitical discourses and social atmosphere, as well as critiques atomic weapons and nuclear energy. Furthermore, many scholars (Napier 2005; Gibson 2013) have explained that the Japanese sci-fi genre has intensively depicted and explored issues regarding robots and nuclear power, thereby contributing to the molding of citizen science and public attitudes toward these technologies.

Interestingly, the outcomes regarding the two issues regarding robots and nuclear power are strikingly different. With robots, earlier studies indicated that the Japanese sci-fi manga (漫画) and anime (アニメ) genres have influenced the Japanese development of robot technologies and the associated public expectations (Schilling 1993; Schodt 2007; Robertson 2007; Sone 2008). As pointed out by Angela Ndalianis (2013) and Jennifer Robertson (2014), robot sci-fi manga and anime have produced a number of popular figures in Japanese cultural history (e.g., Astro-boy, Doraemon, Pokémon), which became embodied in or, at least, impacted the actual progress in Japanese robot technologies. Hiroyuki Nitto, Disuke Taniyama, and Hitomi Inagaki (2017) provided evidence supporting the fact that Japanese citizens show greater acceptance of and invest more hope in robot technologies than do citizens of other countries thanks to sci-fi manga. Furthermore, Mateja Kovacic (2018) argued that robot technologies have played a substantial role in constructing Japanese national identity and pride, where citizens' attitudes toward robots have been arguably constructed through sci-fi.

In contrast, numerous researchers have discussed how Japanese sci-fi representations of nuclear power have produced skeptical and critical attitudes among Japanese citizens (Brophy 2000; Low 2003; Napier 2005; Gibson 2013; Li 2016, 2017). For example, *Coppelion* (2008–2016), a sci-fi manga and anime created by Tomonori Inoue was the focus of much attention during the early 2010s when Kanamori 2013 was published. This sci-fi work, set in the year 2036, describes the lives of Tokyo citizens coping with radioactive contamination in the aftermath of a nuclear meltdown. In March of 2011, three years into the publication of this manga, the Fukushima Nuclear Disaster occurred. As Carl K. Li (2017) argued, *Coppelion* must be taken as the representative of the Japanese sci-fi manga—it entails two common issues of atomic energy within the Japanese sci-fi, namely, atomic bombs and nuclear disaster; it also expresses political discourse and criticisms of nuclear energy and Japan's (science) policies and individual emotions and social atmosphere, such as the fear of nuclear power, which have become clichés in this particular genre. In other words, the Japanese sci-fi genre has rearticulated and reflected citizens' anxieties and mistrust of nuclear power and its policies, which were arguably embodied in the Fukushima Nuclear Disaster. Against this backdrop, science communication and citizen science have been activated further with regard to nuclear energy. Both citizens and academics

have investigated nuclear power and radioactive contamination. These investigations have led to the publication of numerous papers (see, for instance, [Horinouchi 2012](#); [Inoue 2012](#); [Fujigaki 2013](#); [Tsuchiura machizukuri shimin-no-kai 2013](#); [Tsujiikawa 2016](#); [Kiyohara 2017](#)). Needless to say, the Fukushima Nuclear Disaster has damaged Japan's national pride in technologies, while there has been no such disaster or negativity regarding robots.

Despite the contrasting outcomes of each issue, the Japanese sci-fi manga genre has been clearly inscribed and reflected in not only the history of Japanese culture, but also Japanese science communication, public understanding, actual products, and the public reception to the disaster arising out of advanced technologies. In other words, in the early 2010s, Japan witnessed the power of sci-fi exactly as Kanamori (2013) had expected, albeit specifically regarding robots and nuclear technologies, rather than bioethics.

At the same time, medical issues of bioethics and transplant medicine became crucial and leading issues during the 2010s. In 2011, the Organ Transplantation Act of 1997 was amended to follow the so-called Euro-American way, even though the prior version had not only gained public support but also embodied the Japanese sci-fi imagination. Meanwhile, unlike the representations of robots and nuclear energy, sci-fi representations of bioethics and/or organ transplants have attracted comparatively little research attention, and only a few academic studies are available (e.g., [Asai 2011](#); [Yashiro 2007](#)). Under these circumstances, Kanamori (2013) demonstrated the high potential of sci-fi in bioethical debates, especially with reference to its immense influence on Japanese society and even presumably on transplant medicine. To better understand the importance of Kanamori's argument, it should be noted that his book was issued as part of a twenty-volume series by a notable Japanese academic publisher, the first complete book series on Japanese bioethics, which are considered to be the basic reference books on this issue. The series was, arguably, the start of building frameworks for Japanese bioethical consideration.

In this view, Kanamori's paper is of critical importance. First and foremost, it echoes the unique Japanese sociocultural context of citizen engagement and sci-fi representation with regard to the construction of national identity, science communication, and sociopolitical discourse and understanding. As Kanamori (2013) himself demonstrated, sci-fi imaginations and bioethical queries are interwoven within Japanese society, where the relationship between them is parallel to those between sci-fi and robots and between sci-fi and nuclear power. Second, given its wide circulation, his paper disseminated the significance of sci-fi representations for bioethical consideration among many Japanese bioethical researchers and readers. Hence, his argument has been shared and become representative within Japanese society or, at the very least, among a bioethical audience.

In response to Kanamori's thoughts and his importance within diverse Japanese contexts, this article explores sci-fi imaginations concerning the Japanese development of bioethical considerations in tandem with public debates over organ transplantation (OT) from brain-dead donors (BDD). Specifically, I examine how, in Japan, bioethical questions on life and death in terms of the approval process of OT from BDD were articulated during the 1990s, with reference to the influence from the sci-fi genre.

There are three reasons why this paper focuses on the 1990s Japanese debates over transplant medicine. First, Kanamori (2013) analyzed sci-fi stories about transplantation, but with reference to Anglo-American cases. Consequently, his examination does

not fully answer the question it raises—namely, the potential in the Japanese sci-fi genre for illuminating bioethical issues and its impact on bioethical considerations. I therefore wish to follow up on his initial interest. Second, during the 1990s, Japan not only experienced intense public debates, but also came to a resolution through the passing of the Organ Transplantation Act of 1997. As I will demonstrate, in order to gain support these processes mobilized popular sci-fi motifs, sometimes tacitly, but sometimes explicitly. Third, this article offers an East Asian case study, with the intention of enriching this academic area. Kanamori's (2013) paper itself contributes to the existing studies of sci-fi, especially the relationships between bioethics and sci-fi in the Anglo-American context. Earlier studies in this area include works from (but not limited to) David A. Kirby (2004), Alex Romain (2010), Matthew J Czarny, Ruth R. Faden, and Jeremy Sugarman (2010), and Caroline Crosson Gilpin (2017). However, there are few studies that consider non-Western cases, including those of East Asia. This paper represents an attempt to develop STS further, in line with Kanamori's academic interests.

What follows demonstrates the role of the sci-fi imagination with reference to public controversies over transplant medicine and brain death in Japan. I begin by describing the background to this study: the controversies over OT from BDD, which, in 1991, led to the production of a specialized sci-fi drama on the topic, Japanese sci-fi (manga), and Japanese culture. Then, I explore the role of this specialized sci-fi drama within the public controversies and the articulation processes of the drama and debate in conjunction with a couple of Japanese popular sci-fi motifs. In doing so, I will demonstrate how these motifs are interwoven with the cultural history of Japan. Finally, the article discusses how the sci-fi genre illustrated bioethical questions through the shaping of particular sci-fi motifs, a process which, I argue, was inscribed in the resolution of the public debates concerning brain death and OT. Hence, this paper is an attempt to demonstrate the aforementioned potential in sci-fi and the role of sci-fi in bioethics through an East Asian case study.

2 Sci-Fi Imaginations on Organ Transplantation from Brain-Dead Donors in Japan

In February 1991, a sci-fi drama on the topic of OT from BDD premiered in Tokyo, Japan. *Mumyo-no-i* 無明の井 (*The Well of the Ignorance of Truth*), which explored the ontology of an organ donor and a transplant recipient, took the form of Noh (能), a traditional Japanese theatre drama.

Mumyo-no-i was understood, as anthropologist Margaret Lock pointed out in her work, *Twice Dead* (2002), to represent the traditional and unique Japanese view on the matter of life and death, while also attracting maximum public attention. Meanwhile, public debates over OT from BDD had been raging for some years, and Japanese cultural identity and traditional values had been further drawn into the heated controversy. Hence, the Noh drama can be seen as a reflection of and response to the public controversy discourses. I will also argue that the theme and plot of *Mumyo-no-i* reproduced and resonated with the then popular Japanese sci-fi (manga) motif. To demonstrate this point, it is necessary first to comprehend the background to this argument. Therefore, this section deals with the relationships among the public debates on OT from BDD, the Noh drama, the sci-fi (manga) genre, and Japanese culture, tradition, and identity.

First it is necessary to explain the background of the debates over OT from BDD and Japanese cultural identity. In Japan, dissension over brain death and transplant medicine had arisen shortly after the first ever cardiac transplant, which took place in 1967 in South Africa, by the first such operation in Japan, known as the Wada Heart Transplant Case, in 1968. The controversy withered away in the early 1970s, chiefly because low survival rates had led medical authorities worldwide to lose confidence in transplant medicine, which brought about a decade-long moratorium on OT from BDD. However, in the early 1980s many Euro-American countries succeeded not only in improving the survival rate after transplantation, but also in determining brain death as the end of human life, thereby allowing surgeons to perform OT from BDD. Consequently, there was a huge growth in the number of cardiac transplants. Japanese policy makers wished to emulate these Western achievements, and thus sought approval to establish a certain legal status of brain death, in order to permit surgeons to extract a heart from a brain-dead body for transplantation. Without a new legal status for brain death, a heart transplant case would be considered murder, because the donor would be assumed to be alive. Accordingly, Japanese policy makers entered into dialogue with medical and legal professionals.

These dialogues among policy makers and professionals evolved into public debates, which in turn formulated the questions and tests that must be satisfied in order to authorize OT from BDD. There were four main questions to be answered: (1) whether brain death could be diagnosed accurately, and if so, in what way; (2) how brain death should be legally defined so as to achieve public consensus; (3) on what terms OT from BDD could be authorized; and (4) in what ways deathbed care should be provided to a brain-dead person—that is, one who could possibly be recognized to be dead, but whose heart was still beating. A range of views were expressed in response to these questions. From around 1985 the public debate intensified, such that the topic became recognized as a major sociopolitical issue, known as *noshi-mondai* 脳死問題 (the brain-death problem). One reason for this was the failure to work through the first question sketched out above: Japanese medical professionals were themselves divided as to the notion of and diagnostic procedures for brain death. Without consensus on this issue, the other three items could not be handled comprehensively, even though the discussions tackled some important questions. Consequently, toward the end of the 1980s, the brain-death problem had reached what Lock (2002: 5) called “an impasse.”

Meanwhile, a fifth question gradually emerged from these chaotic discussions. This new item on the agenda was culture—the matter of culture in terms of Japanese tradition, culture, pride, and/or identity. Many critics ascribed the lack of Japanese success in authorizing OT from BDD to Japanese culture. Here the concept of Japanese culture was, as I have argued elsewhere, “used to explain and define differences, particularly between Japan and the West” (Sasaki 2006a: 32), just as the concept of gender enables us to describe differences between men and women. In brief, throughout the brain-death problem discourse, the way in which the Japanese sociopolitical process of authorizing OT from BDD differed from that of Euro-America was explained in light of Japanese culture.

Culture surrounding the brain-death problem discourse encompassed two contrasting nuances. On the one hand, Japanese culture was regarded as too backward to follow Western rationalism and civilization. This standpoint was linked to the claim that authorization of OT from BDD could be accomplished only through enlightening

Japanese culture. On the other hand, the Japanese hesitation to normalize OT from BDD was attributed to an invaluable oriental heritage, seen as a protection against Westernization. At the same time, the Japanese process of authorizing transplant medicine from BDD was evaluated as more traditional, humanized, and scientific than that of the West. For proponents of this argument, Euro-American professionals were too eager to give official approval to OT from BDD to consider aspects such as socially inherited customs and views regarding death and dead bodies (i.e., tradition), the public understanding of death (i.e., humanized approach), and the scientific evidence on brain death. This stance led to a call for an alternative approach to brain death and transplant medicine, one that would enable society to respect traditional values, science, and humanity, an approach called by its proponents “Japaneseness.”

These interpretations of Japanese culture were articulated in conjunction with the existing four questions under debate that were noted earlier. Once public attention was drawn to the idea of Japaneseness, people began to consider it as an important factor in constructing public consensus on the issue of transplant medicine and brain death. Likewise, as will be shown below, Japaneseness and/or tradition were invoked in a certain protocol for deathbed care of brain-dead patients, that is, “thy death,” and in a distinct legal status of brain death, that is, brain-death as “the interim period between life and death,” to authorize OT from BDD. The controversy converged on Japaneseness alongside the previous strands of debate.

It was against this backdrop that the sci-fi Noh play *Mumyo-no-i* was devised. A question thus arises with reference to the aforementioned argument of this article: what is the relationship between the Japanese sci-fi (manga) genre and *Mumyo-no-i*, which was deeply associated with the public debates, Japanese cultural tradition, and/or Japaneseness? Let me first define the term *Japaneseness*. Japaneseness means certain customs and values widely shared by the contemporary Japanese population. It can include ways in which sympathy or empathy is evoked and unity established among the Japanese people. Hence, Japaneseness does not necessarily refer to traditional heritage such as Shintoism, ninja, and geisha. As with the usage of culture within brain-death problem discourse, Japaneseness also implies the disparity between Euro-American modernity and its Japanese counterpart. However, whereas (Euro-American) modernity was considered as the antonym of (Japanese) traditional and humanized values within brain-death problem discourse, I do not follow this particular implication. Rather, I simply emphasize how Japanese shared values and/or subtle unity can be constructed through certain phenomena, that is, Japaneseness. With this understanding, we can further understand the relationships among Noh, sci-fi, and Japaneseness as seen in the case of *Mumyo-no-i*.

Around the end of the 1980s, Tomio Tada 多田富雄, an immunologist and Noh enthusiast, was asked to explore the brain-death problem via the Noh medium (Tada 1991: 1128). The result was *Mumyo-no-i*. In this play, Tada used the case of a cardiac transplant from a BDD to consider an ontological question about donor and recipient and to explore the unique “Japanese cognition of life and death” in contrast to the Euro-American understanding (Tada, Itsuki, and Nakajima 1994: 8–9). The drama was therefore designed to invoke Japaneseness.

These features are reflected in the play’s title, where *mumyo* is a Buddhist reference to ignorance of the fundamental truth and karma. Hence, the drama was expected to portray the state of ignorance about life and death apropos to traditional religious

significance. At this point, a question arises. Why was Noh regarded as the appropriate genre to explore the brain-death problem with overtones of Buddhism and Japaneseness? In fact, a common theme of Noh drama has been the seeking of a certain “spiritual goal” by a deceased person, where their frustration concerning other characters is transformed into something positive (Harris 2006: 94–95). Within this framework, a Noh drama, according to James Bardon (1994: iii), “evokes a mood of an emotion, a religious state,” partly because the deceased’s confusion and frustration are resolved through a re-examination of his or her recollection of the past. Because the style of this genre was established around the fourteenth and fifteenth centuries, Noh performance is recognized as conventional. In any performance there can be novel elements, however. Eric Rath (1997: 33) demonstrated how the modern “myth” of the Noh play as necessarily “traditional” was constructed. In other words, contemporary ideas and styles can be included in a Noh play even if it tends to be perceived as traditional.

Mumyo-no-i exemplifies these traits of Noh drama. Its story conveys the confusions and frustrations of deceased characters, with specific reference to a case of OT from BDD. It also encompasses “a religious state,” because it illustrates the mumyo of the organ donor and recipient and their search for salvation. *Mumyo-no-i* acquired the status of a traditional representation of the subject. Televised in Japan and staged in several places in Japan and the United States, it attracted great attention from the American and Japanese media, which treated it as such (Tada 1992: 336; Lock 2002: 57). Furthermore, Lock (2002: 160) reported that the play was “more than a modern morality story” as it “subtly unifi[ed] the [Japanese] audience by drawing on and rekindling their sensibility to the qualities widely ascribed to the Japanese.” It could hence evoke a sense of solidarity around the idea of Japaneseness.

These qualities in *Mumyo-no-i* are also to be found in the sci-fi manga genre. Specifically, the genre has been associated with ontological questions over a humanlike creature (cf. a brain-dead organ donor), body-parts exchanges, and Japaneseness. Here, I focus on the latter, Japaneseness. The former elements shall be examined in the next section.

The development of Japanese sci-fi owed much to the postwar manga genre and, in particular, to its founder Osamu Tezuka 手塚治虫 (1928–1989), who made a distinctive contribution to popularizing and augmenting Japanese manga and animation, including sci-fi. In 1947 Tezuka produced a long manga book, entitled *Shin-takarajima* 新宝島 (*New Treasure Island*), which became an “instant hit” (Orbaugh 2011: 116). He subsequently developed various manga, including three of his popular sci-fi manga, *Lost World* (1948), *Metropolis* (1949), and *Kitarubeki-Sekai* 来るべき世界 (*Next World*) (1951). The success of these works sparked “the manga boom” (116) in postwar Japanese society.

As noted by cultural critic Tomofusa Kure (1997: 133–34), from the late 1940s onward, Tezuka occupied a prominent role in establishing and disseminating the genres of sci-fi, manga, and animation in Japan. For example, Tezuka (2000) himself states that sci-fi manga and sci-fi novels cooperated to establish the Japanese sci-fi genre, primarily because the readership for the two were very similar (see also Ban and Tezuka Productions 1994b: 24–27). Tezuka also made a significant contribution to anime, the Japanese animation genre founded in the 1960s that was epitomized by one of his sci-fi manga, *Astro-boy* 鉄腕アトム. This story was later adapted into anime and is said to have been the first Japanese television animation series. According to

Orbaugh (2011: 115), the process by which animation became an established genre can be attributed to the ongoing “manga boom and the SF [manga] boom.” Hence, Tezuka can be regarded as the father of the genres of sci-fi, manga, and anime.

These contexts of sci-fi, manga, and anime have formed a contemporary Japanese-ness. Firstly, the work of Tezuka—as Tetuso Sakurai (1990: 200) maintains—was crucial in the Japanese cultural history not only because Tezuka created the framework for the aforementioned genres, but also because of their popularity with both children and adults. Tezuka and even the manga genre itself have been regarded as having had a considerable effect on the Japanese way of thinking. For instance, the eminent manga critic Fusanosuke Natsume 夏目房之介 ([1989] 1995a: 9) stated that “the framework of Tezuka’s manga stories has been my own unconscious conceptual framework” in a memorial to Tezuka. This memorial received “agreeable feedback” (Natsume 1995b: 12). I hence hypothesize that a popular theme within this genre would be highly appreciated by the postwar Japanese audience, even if “subconsciously” as noted by Natsume ([1989] 1995a: 9).

The argumentation and hypothesis I have laid out above can be supported by the sociopolitical analysis of the construction of modern shared values within a nation. For instance, Benedict Anderson (1991) demonstrated that modern print capitalism—the mass distribution of newspapers and novels—has played a significant role in forging national identities. As noted by Anthony D. Smith (1986), Eric Hobsbawm (1983a, 1983b), and Ernest Gellner (1983), the construction of national cultural heritage, tradition, and identity relies on the (printed) media and their production of cultural imaginations through which a shared atmosphere is formulated among the nationals. Sci-fi manga and anime about robots are certainly to be included in this, as they have contributed to the formulation of national identity and pride within Japanese society (Schodt 2007; Robertson 2007, 2014; Ndalianis 2013; Kovacic 2018). Furthermore, Koichi Iwabuchi (2002, 2015) illuminates how, since the 1990s, the Japanese manga and anime genres have created sociocultural and sociopolitical domains for articulating the Japanese national identity. It is hence not surprising that Tezuka’s framework vis-à-vis the sci-fi manga genre has taken its place among Japanese shared values, namely, Japaneseness.

Bearing this context in mind, the next section explores the role of sci-fi in connection with the Japanese bioethical considerations regarding the brain-death problem. The Noh performance, I shall argue, mobilized both Buddhist references and typical Japanese sci-fi manga motifs—what Kanamori (2013: 4) would refer to as the solid presence within the Japanese “cultural history”—thereby invoking Japaneseness.

3 Sci-Fi Motifs, Japaneseness, and Bioethical Considerations on Brain Death and Organ Transplantation

In this section I will argue that the imaginative framework within Japanese sci-fi could be evoked by, as well as inscribed in, the Noh drama, and this evocation generates the sense of Japaneseness. I also shed light on the way in which the Japanese sci-fi imagination took on the shape of the legal and medical practices of transplant medicine in the late 1990s. I will first indicate how the themes of the Noh drama corresponded to certain contemporary issues and brain-death problem discourse. One of the themes

could be explained by a notion proposed through the brain-death problem debate by the philosopher Masahiro Morioka 森岡正博, whose insight entails a specific anthropological quality originally established by the modern French thinker Jean Baudrillard. The second part of this section concerns how the Noh was able to invoke the prevailing modern Japanese sci-fi motifs, which then enabled the Noh to evoke Japaneseness. I examine a number of sci-fi stories which echo not only the contemporaneous Japanese attitude to body-part exchanges, but also the themes of *Mumyo-no-i*.

Mumyo-no-i indicates the agony of two characters: a young woman and a fisherman, who are the recipient and donor, respectively. In the epilogue, the two ghosts return together to the well, where they beg the monk “to emancipate them from [their] endless suffering” (Tada 1992: 330). The story ends with their mumyo status, their uncertainty over the recognition of life and death (322). The fisherman cannot define himself as either living or dead, because his heart was taken while his body was still alive. The woman is anguished over receiving his living heart and, thus, was ambivalent about her own existence. In other words, their mumyo stems from not only their grudging exchange between the living and the dead but also from their ambiguous ontological status.

Accordingly, questions arise as to how this particular mumyo reflects Japanese traditional and/or religious values, the brain-death problem, the Japanese sci-fi motif, and Japaneseness. To answer this, what follows examines three issues: whether the matter of ontology would derive from Japanese traditional/Buddhist perception; in what ways the mumyo projected the brain-death problem controversy on which the Noh dramatist had originally been requested to reflect; and how the mumyo theme would be associated with the Japanese sci-fi manga motif and Japaneseness.

First, it is necessary to note that seeking and building self-identity is a rather (Western) modern issue (see, for instance, Hall 1997, 2001). It has no real reference point in Japanese tradition or Buddhism. Indeed, few if any major conventional Noh plots that were produced before the mid-nineteenth century could be said to imply any such questions regarding self-recognition or uncertainty about one’s identity. It is therefore fair to say that this play deviates somewhat from Japanese traditional and/or religious approaches to an individual’s frustration and/or spiritual goal.

Second, the agony of the fisherman, which can be seen as the ontology of the brain-dead person, echoes one of the main issues articulated within the brain-death problem. Both medical professionals and bioethics thinkers faced a new challenge, namely, how to provide deathbed care or treatment for a brain-dead patient whose ontology is ambiguous and how to accommodate the needs and wishes of their family in this regard. Such patients could be considered deceased, yet their hearts continued to beat; their breathing and other physiological functions were also maintained. Thus, the ontological question raised by the fisherman in *Mumyo-no-i* was endorsed by certain brain-death problem discourses, where from the mid-1980s, special consideration was given to the brain-dead patients and the treatment and care that they should receive.

Such considerations brought about a new bioethical concept of deathbed care for the brain dead. Proposed by Morioka ([1989] 1991: 143–44), it can be summarized as a movement for appreciating “thy death” 親しい他者の死/二人称の死, via provision of a specific kind of deathbed care ritual. Morioka emphasizes the importance of receiving and acknowledging the life of the deceased through the giving of deathbed care by their loved ones together with medical staff. Deathbed care, in Morioka’s view, guarantees

our socioethical relationships between life and death, including maintaining the dignity of the dying and providing reassurance for the bereaved. A brain-dead patient, he maintains, might be deprived of such a death ritual. His argument derives from his concern regarding the ongoing attempt to establish a new code of practice on brain death, which might encourage medical professionals to rush into letting the brain-dead go, in order both to facilitate organ extraction for transplantation and to reduce the cost of keeping the brain-dead person alive. He asserted that, without appreciation of the ontological significance of a brain-dead person, an experience of brain death would be not only unethical with regard to the brain-dead person but also traumatic for the bereaved family.

In this view, Morioka formulated a new bioethical protocol for brain-dead patients for the sake of *thy death*. It allowed the provision of deathbed care until the family (and perhaps other loved ones) of the patient could accept their bereavement, while also respecting the will of the dying patient regarding their own deathbed care. Clinical and personal evidence was cited to confirm how “*thy death*” experience was to be established; through such deathbed care experiences, families had “come to acknowledge the life of the brain-dead person” and to recognize their dying experience (Morioka [1989] 1991: 63–69, 73–76).

Morioka’s proposal caught the public interest, with his book selling a total of twenty thousand copies. His terminology was adopted within the public. From the 1990s, Morioka’s terminology or concept as “*thy death*” has been adopted by both popular writers and scholars, such as Kunio Yanagida (1995b), Norie Higa (1996), and Minoru Tanahashi and his colleagues (1999), in their consideration of the brain-death problem. Consequently, the general public came to conceive of one of the crucial issues of the brain-death problem in terms of “*thy death*.” In response to this, the parliamentary debate records about the bills authorizing transplant medicine from brain-dead donors (see, for instance, Nakayama 1995) appeared to address the issues that had converged on “*thy death*,” namely, acknowledging the life of the brain-dead person and recognizing the dying experience.

From a sociological perspective, Morioka’s “*thy death*” can be construed as a social ritual—a “symbolic exchange” of life and death in Baudrillard’s ([1976] 1993) terms. Death is, according to Baudrillard ([1976] 1993: 134, italics as in original text), “socially or symbolically exchanged in any case[:] at best, *it will be exchanged* in accordance with a social ritual.” The brain-death problem hence produced an argument for the social ritual of symbolic exchange between life and death.

Baudrillard maintains that the primitive ritual of cannibalism (in which the bereaved eat the body of the deceased) is one such social ritual. For Baudrillard, in the conventional cannibalism ritual, the body of the deceased is transformed into “social exchange”: the deceased is donated to the bereaved and then taken with grateful respect, through which “the flesh [transmutes] into a symbolic relation” (Baudrillard [1976] 1993: 137–38). This could be, I suggest here, a good contrast to OT from BDD. Part of the body is taken by a recipient, but there is no social ritual of symbolic exchange, because the main significance of a transplant organ is its substantial usefulness to its recipient (i.e., replacing a malfunctioning organ) rather than a symbolic relation with the deceased organ donor. In other words, OT from BDD can be considered as degenerated symbolic exchange between life and death.

Returning to the mummy theme, we can now explain the agony of the fisherman and the lady through thy death vis-à-vis Baudrillard's symbolic exchange. The fisherman does not receive deathbed care; his ontology of being dead/dying is not properly exchanged symbolically with the living through a social ritual. Rather his death is desecrated through a body-part exchange without any agreement from himself. This situation is in stark contrast to the "thy death" model, as it is exactly what Morioka has tried to avoid. As for the case of the lady's mummy in the drama, her reception of such an organ would be quite unlike the primitive ritual of cannibalism. This organ exchange could not turn into a social ritual, because the donor's death is not fully appreciated by the recipient, so that his organ cannot transmute into a symbolic relation between life and death. Therefore, the mummy of this Noh drama derives from degenerated symbolic exchange between life and death; it relates the matter of failure to provide a deathbed ritual, called "thy death" within the brain-death problem. Then, in what ways could these two mummy themes evoke Japaneseness? The fisherman's ontological query derives not from Japanese traditional values, but from modern perceptions of self-identity; it was the matter of symbolic exchange in death that was the bioethical consideration in the then ongoing public debate.

The answer, as set out below, lies in the Japanese sci-fi manga genre. Alongside *Mummy-no-i*, I will cast here the popular sci-fi manga motifs that were formed in this genre in connection with the matter of existential woe, thy death, and symbolic exchange between life and death. I also indicate how the Noh theme would draw on these sci-fi imaginations.

Viewed in this light, then, I explore ways in which the two mummy themes in the Noh play tacitly mobilize a couple of popular sci-fi manga motifs, thereby not only invoking Japaneseness but also contributing to the establishment of a bioethical model for OT from BDD. The examination of the two mummy themes here comprises three arguments: on ontology; on symbolic exchange and thy death; and on Japaneseness.

First, the question of ontology in relation to the development of science and technologies had been addressed in postwar sci-fi manga since the beginning of the emergence of this genre, in the 1940s. It was commonly depicted through an android or cyborg, which is arguably comparable to that of a brain-dead person, considering that the latter is also controlled by technology (i.e., through a life-support machine). Tezuka's contribution was vital in constructing this popular motif, as he continuously illustrated the dilemma of such marginal beings, particularly in terms of their existential woe and their exclusion from any category (see Sakurai 1990; Natsume 1995b). From the 1960s onward, this theme was adapted by other manga writers, thereby becoming a common motif (see Orbaugh 2011 for more details). Japanese sci-fi manga has produced this popular motif addressing the existential woe of androids and cyborgs.

During the 1990s, when the brain-death problem debates were reaching their peak, sci-fi manga developed stories with this motif. *Ghost in the Shell* (Shirow [1991] 2002 [manga]; Oshii 1995 [anime]), for example, tells the story of the cyborg Motoko, who questions her identity alongside her mechanical functions and her human nature. Other stories, such as *Oz* (Itsuki 1990–1992), portray androids' confusion over their existential meaning. The question "Who am I?" stems from the human recognition of an android's feelings and thinking as artificially programmed, rather than genuinely their own (see Figure 1). Their uncertainty over their ontology thus arises either from the *addition* of body parts to a human body or the absolute *lack* of a human biological mechanism.



Fig. 1 Question of an android's (i.e., no. 19) identity (Itsuki 1990a: 155 [© NATSUKI ITSUKI/HAKUSENSHA]; sides reversed for English readers since the Japanese language reads from the right).

There is hence an analogy between this motif and one of the themes of *Mumyo-no-i*, namely, ambiguity as an existential being. The question of the cyborg or android's identity is parallel not only to the sadness of the organ recipient in the Noh, which derives from having an *extra* body part (cf. a cyborg), but also to the fisherman's inability to define his identity as an existential being, which is deeply linked to his *loss* of a body part (cf. an android). Furthermore, the depiction of the fisherman's spirit

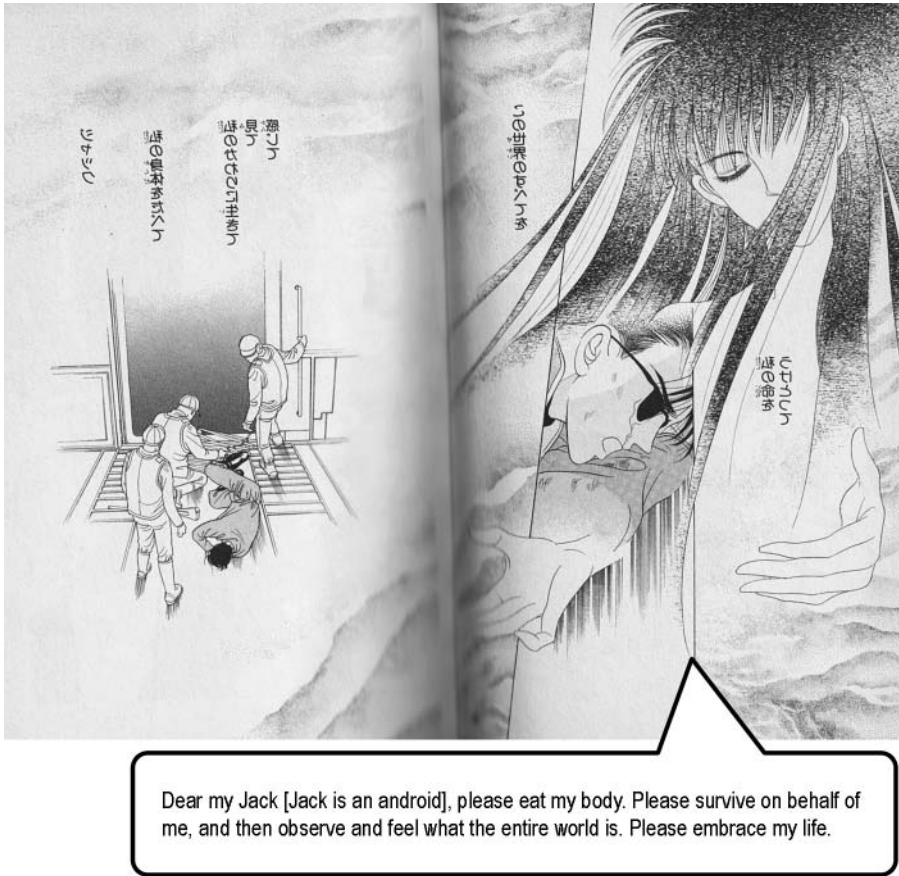
being refused entry to the world of the dead coincides with the established sci-fi manga motif of the exclusion of a marginal entity.

Second, such manga stories can portray more directly the mumyo themes that the Noh showed obliquely. As the matter of the marginal being's identity unfolds in the story, its existence can—metaphorically, and in contrast to the two ghosts in the Noh—be emancipated from its mumyo through a distinctive form of symbolic exchange between life and death. This salvation comprises four phases, which embrace a certain pattern of symbolic exchange with death, including the comparable significance of Morioka's thy death. First, an android gives deathbed care to a dying person. Second, the android receives the material body of the deceased. Third, the android reciprocates this gift by abandoning its own body or specific bodily function, which has equivalent value to what the deceased has given. Finally, the android establishes its identity as an existential being, which it had previously struggled to do in the light of the lack of (or extra) body parts. In the aforementioned stories of *Oz*, *20xx*, and other works, the lack of an actual body for an android is thus a crucial point. An episode in *20xx* (Shimizu [1992] 1994) describes a symbolic exchange process with more allegorical overtones. It encompasses a sort of cannibalism by an android who does not need to eat to survive but his appetite and consumption of food are part of his original programming. Meanwhile, the leading human character always appreciates the lives she eats, and she wants the android—whom she loves—to eat her body in appreciation of her life by completing the ritual in her native place. However, when she sacrifices herself for the android, he cannot carry out her wish to eat her flesh. After her death, the android believes that the human body is the only food he should ever have eaten and spends substantial sums of money on eliminating his appetite from his bodily functions, thus indicating his appreciation of the human's life and his reciprocation of her gift (see Figure 2). This also emancipates him from his existential woe arising from his mechanically controlled quasibiological function—eating—that has no meaning for his survival.

These manga stories thus reproduced, and perhaps elaborated further, the then popular sci-fi motif that encompassed a sort of celebration of the confirmation of one's ontology through what Morioka calls thy death. Specifically, the one gives deathbed care to “thou” and in return, receives “thy” ontological significance, thereby establishing their own identity. Put simply, these sci-fi stories clarified the ideal bioethical model of deathbed care, that is, thy death, in terms of how the mutually appreciated and reciprocal symbolic exchange between the deceased and bereaved would release the latter from its existential woe.

In view of this, the mumyo depicted in the Noh play can be seen as the very opposite of the sci-fi manga motif, a sort of rupture of the quality of symbolic exchange with death. Specifically, the fisherman gave the woman his heart, but the woman did not offer the fisherman proper deathbed care or appreciate “thy death,” which led to both characters suffering an ambiguous ontological status, otherwise known as mumyo.

Similarly, *Mumyo-no-i* could evoke Japaneseness. In its depiction of a case of degenerated symbolic exchange between life and death and the existential woe of the characters concerned, it presented motifs that were familiar within the sci-fi manga genre, but with an opposite outcome. Nevertheless, because, as Natsume ([1989] 1995a) has shown, these motifs are inscribed in the Japanese common conceptual framework, it is possible, I argue, that the very theme of this Noh production invokes shared values among the majority of the Japanese audience.



Dear my Jack [Jack is an android], please eat my body. Please survive on behalf of me, and then observe and feel what the entire world is. Please embrace my life.

Fig. 2 Symbolic significance of cannibalism (Shimizu [1992] 1994: 158–59 [© REIKO SHIMIZU/ HAKUSENSHA]; reversed for the English reader, since the Japanese language reads from the right).

As has been demonstrated, the Japanese sci-fi genre articulated a distinctive bioethical query on ontology in connection with body-parts/function exchange between life and death. Given that, as Kanamori (2013: 3–4) indicates, the genre has attained a unique position in Japanese “cultural history,” it was then inevitable that it would influence debate around the brain-death problem and impact Japanese bioethical considerations. First, the theme that was newly elaborated in the Noh drama with regard to the brain-death problem was parallel to the established sci-fi manga motif. It can hence be said to have been an adaptation of the sci-fi manga motif for the traditional cultural form, Noh, while representing not only Japaneseness but also bioethical inquiries. Specifically, while the Noh drama evoked Japaneseness, this evocation should be ascribed not so much to the so-called traditional values, but rather to the play’s adaptation of motifs from a genre that has molded not only Japaneseness but also bioethical topics and models. Second, the brain-death problem constructed the issue of thy death, the significance of which had been far more vividly illuminated through this established sci-fi motif of symbolic exchange between life and death. In other words, here we can find one of the main roles of the sci-fi genre with reference to its bioethical imagination. Furthermore, the bioethical concept of Morioka’s thy death gained public support. As

noted earlier, its significance was not only embedded in the Noh drama but also demonstrated through various sci-fi manga stories. This might then have influenced the further development of the brain-death problem, as I shall explore below.

4 From Cultural History to Factual Embodiment

The production of *Mumyo-no-i*, which “subtly unified the Japanese audience” (Lock 2002: 160), was itself remarkable for the cultural history of Japan. Subsequently, the debate continued to evolve in tandem with further articulation of thy death and Japaneseness. This section explores how the sci-fi imagination was mobilized and then rearticulated alongside construction of the argument for Japaneseness through public debates over the brain-death problem.

It was this (re)articulation process, I argue, that led to the Organ Transplantation Act of 1997, which confirmed Morioka’s notion of a (bioethical) code of practice for OT from BDD. This process included two remarkable developments in the context of this paper. First, within the brain-death problem debate, there was further mobilization of a sci-fi manga motif with reference to symbolic exchange between life and death and Japanese traditional values. Second, whereas the act was said to realize traditional Japanese attitudes toward life and death, I argue that it was in this realization that the significance of the popular sci-fi motif was embodied.

During the 1990s, in particular, the brain-death problem controversy saw the articulation of the legal definition of brain death and bioethical considerations over thy death vis-à-vis Japaneseness. The judicial interpretation of humanized and conventional death, namely, seeing brain death as “the interim period of life and death,” had been discussed throughout the brain-death problem debates (Nakayama 1995; Minority Opinion from *Rinji Noshi oyobi Zoukiishoku Chousa-kai kai* 1991, 1992; Bai 1983a, 1983b; Yanagida 1995a, 1995b, 1998). This legal interpretation was originally proposed by Kouichi Bai 唄孝一 (1968: 19) as he considered it comparable to the legal status of “an [embryo and] fetus”—during this interim period, a brain-dead body should be respected as a living entity, like a fetus; life-support and organs could be removed only if both the brain-dead person and his or her bereaved accepted this, as in the case of an abortion.

In the late 1990s there was much attention focused within the brain-death problem debates on a book by Yoshihiko Komatsu 小松美彦 (1996), a historian, bioethicist, and close friend of the late Professor Kanamori Osamu himself. It was published a year after the bill had been aborted during the parliamentary debates on whether to guarantee the experience of thy death in deathbed care and a year before the parliamentary debates through which the Organ Transplantation Act of 1997, which was in favor of thy death, was codified.

Komatsu (1996) introduced the idea of “*kyomei-suru shi*” 共鳴する死 (resonance with death) to bioethics, a notion that was immediately adopted in public and academic discourse (see also Tateiwa 1997; Hagiwara 2001). This concept was almost identical to Morioka’s “thy death,” albeit carrying traditional moral connotations. Based on his comparison between traditional death experience and modern death, Komatsu (1996) advocated for the former, as found in specific forms of deathbed care, where there is a symbolic giving of death and receiving of life. He termed this “resonance with death”

because such deathbed experiences encompass a reciprocal relationship, with a solid psychological tie, between life and death. The point of his book was that to adopt the modern (Western) model of OT from BDD would destroy a part of Japanese cultural heritage, namely, the resonance with death ritual, and that Japan should affirm a unique model that would maintain traditional values of life and death. This argument was in line with the then predominant discourse on the brain-death problem, where Japanese-ness was invoked and appreciated by the general public.

For that purpose, various cases of deathbed care were mobilized, which could add historical reference points to Morioka's "thy death" model. Nevertheless, it was through drawing on a story from a quasi-sci-fi manga that the ideal prototype of resonance with death was shaped. Specifically, [Komatsu \(1996\)](#) began with the description of a scene in *Kamui Gaiden* カムイ外伝 (*Spin-Off Tale of Kamui*). The main character, Kamui, is a marginal man, as in the above sci-fi manga popular motif. However, this story is set not in the future, but in the sixteenth to seventeenth centuries with quasi-sci-fi imagination, ninja magic, and tricks, in accordance with Komatsu's point concerning traditional values. [Komatsu \(1996: 5\)](#) has argued that the episode in this work "tell us that a death ought to be accomplished by not only an individual incident of end of life, but also those who acknowledged it and provided [reciprocal] deathbed care" for the beloved one. Komatsu's ideal was thus embodied in the typical theme of a marginal man's reception of a human's death within sci-fi manga, albeit unfolding within the traditional setting, like the *Mumyo-no-i* drama. Komatsu used extracts from famous literature mainly from Europe, together with current Japanese clinical cases, rather than actual cultural heritage or customs, considering that the latter are diverse across not only different social classes, but also Europe and Japan. These supportive examples were nevertheless considered as reconfirmation of his ideal deathbed care vis-à-vis traditional values, because each of them, [Komatsu \(1996: 52\)](#) maintained, "should be epitomized by the case in *Kamui Gaiden*," the prototype of his ideal.

Komatsu's bioethical considerations over resonance with death were thus formulated through his adaptation of the specific motif within the Japanese sci-fi manga genre. This process is therefore parallel to *Mumyo-no-i*, which also evokes this motif and Japaneseness, including its implication of traditional values. I hence argue that the foundation of resonance with death through Japaneseness in Japanese bioethics owed much to the mobilization of the popular sci-fi manga motif.

The bill that would determine brain death to be the end of life in order to normalize OT from BDD had been proposed and examined in the Japanese parliament in 1995 and 1997. The 1995 version was aborted; that of 1997 was eventually amended to the 1997 legislation through the debate process.

This amendment can arguably be ascribed to the public skepticism and criticism against the definition of brain death as the end of human life, which was generally regarded as Westernization and possible deprivation of the thy death experience for both brain-dead patients and their bereaved families (see [Sasaki 2006b](#) for more details). In other words, public opinion could have some impact on this legislation process because the population was, as was asserted by the promoters of "the interim period," in favor of the concept of "thy death."

It can be said that, by drawing on public support, the 1997 legislation ratified the definition of brain death as "the interim period between life and death." It imposed a condition of individual prior consent to be a BDD with the proviso of respecting the bereaved family's veto, while the attached bioethical guidelines emphasized the

importance of a particular bioethical protocol of deathbed care for brain-dead patients, that is to say, thy death. It thus realized the legal stance for the right to thy death with reference to Japaneseness.

A question then arises about this process: why would the general public agree to the then newly articulated legal understanding of brain death as “the interim period” in conjunction with the “thy death” bioethical deathbed care model? This situation, I suggest here, stemmed from the general acknowledgement of the motif of reciprocal symbolic exchange between life and death that had been constructed through the Japanese sci-fi manga genre. As discussed earlier, this motif was reflected in the shared values of the Japanese population and vice versa, since a number of thy death experiences that were reported through publications could either implicitly evoke or explicitly invoke this established manga motif from Japanese cultural history. This can be seen as a parallel to the tacit mobilization of the motif in *Mumyo-no-i*. Hence, many Japanese deeply sympathized with the “thy death” bioethical protocol, thereby supporting the legal stance for “the interim period.”

Hence, the Japanese Organ Transplantation Act of 1997 embodied certain parts of Japaneseness surrounding the brain-death problem. Many researchers, including Lock (2002), Byung-Sun Cho (2003), and Yasushi Makiyama (2005), have attributed the content of the act and its differences from Euro-American legislation mainly to Japanese traditional perceptions of and customs for death. However, as has been illuminated here, it mainly reflected the contemporary Japanese sci-fi bioethical imagination, relying heavily on a popular Japanese sci-fi motif that could evoke shared Japanese values and thus unify the public, and was articulated with the thy death bioethical protocol. Thus, it is, rather, the popular sci-fi manga motif that was realized through this 1997 legislation, together with the bioethical protocol for deathbed care in Japan.³

5 Conclusion

Inspired by Kanamori’s (2013) paper discussing the potential of the Japanese sci-fi genre in bioethical considerations, this article has examined the role of a couple of sci-fi motifs within one of the most important bioethical issues in Japan, the brain-death problem. It has shed light on four main aspects with regard to the debate around this issue. First it has shown how one of these sci-fi motifs, originating in the Japanese manga genre, had elaborated the significance of “symbolic exchange of life and death” in Baudrillard’s ([1976] 1993) term. The motif is basically composed of a provision of deathbed care by a marginal being (e.g., an android) to a human being and an exchange of body parts or functions (e.g., an organ) between them through which the existential value of life and death is mutually appreciated and blessed.

Second, this inquiry has elucidated the ways in which the aforementioned sci-fi motif was implicitly or explicitly mobilized and then interwoven with the development

³ The Act of 1997 has now been amended into the Organ Transplantation Act of 2011. As a result, the legal notion of brain death as “the interim period between life and death” would not now be applied fully for transplant medicine; meanwhile, the legal interpretation of brain death as the end of human life was also not fully adopted by the Act of 2011. Nonetheless, it again endorses the right for thy death and the bioethical protocol for such deathbed care. Thus, the influence of thy death and the sci-fi motif is arguably applicable to the Act of 2011. Because this matter is beyond the scope of this article, I do not consider it further here.

of the brain-death problem discourse, with particular reference to Tada's *Mumyo-no-i* (originally performed in 1991), Morioka's ([1989] 1991) "thy death" ritual, Komatsu's (1996) "resonance with death," and Bai's (1968) brain-death as "the interim period between life and death." Public debate on the brain-death problem eventually led to the Organ Transplantation Act of 1997, which established the legal position of "the interim period" of death as response to bioethical consideration over thy death respecting the symbolic exchange of life and death. This paper has hence argued that a specific sci-fi manga motif was embodied through the act.

Third, this analysis was intended to strengthen what Kanamori (2013) achieved in the field of STS in the following two respects. First, it has cast light on how the sci-fi genre could reflect, and be reflected in, Japanese bioethical considerations over OT from BDDs. In doing so it has, I suggest, fulfilled his original interest in the influence of the Japanese sci-fi genre, including manga, on Japanese "cultural history" and bioethical inquiry (Kanamori 2013: 4). Second, it has offered an East Asian case study to investigate the role of sci-fi in critical considerations of bioethical matters. Despite his keen interest in the Japanese situation, in his examination of sci-fi stories with reference to OT, Kanamori (2013) adopted Euro-American, rather than Japanese, case studies. Indeed, most academic inquiries in this field have addressed mainly Anglo-American cases, while examinations looking at other contexts, including East Asian ones, are currently too limited to evaluate the role of sci-fi in those regions. Hence, this study has taken on a task Kanamori might have gone on to tackle himself.

Lastly, it has demonstrated the further potential of sci-fi in Kanamori's (2013) terms, in which it has explained ways an established sci-fi motif within Japanese cultural history impacted bioethical considerations that were realized in the Organ Transplantation Act of 1997, which included the protocol for deathbed care. In other words, a particular fictional conception in Japanese "cultural history" became the "factually existing" (Kanamori 2013: 4) bioethical model. This paper has also argued that this sci-fi motif could invoke Japaneseness and thus came to be involved in the cultural politics surrounding Japanese reflection over the adoption of (Western) science and technologies. The notion of Japaneseness had already been mobilized in controversies regarding science and technologies, including biomedical and bioethical issues (see, for instance, Lock 2002; Sasaki 2006a). Popular sci-fi motifs could hence be explicitly or implicitly utilized in public debates in these areas, indicating a further role of the Japanese sci-fi genre in public consideration of science, technologies, and medicine in Japan.

In summary, this paper has responded to Kanamori (2013) by arguing ways in which the Japanese sci-fi genre might impact bioethical considerations. It has attained its three aims: discussing the Japanese case for OT vis-à-vis Kanamori's original interest in it; presenting an East Asian case study in light of the dominant Anglo-American focus; and exploring the further potential of the sci-fi genre for stimulating and/or expanding bioethical considerations and the Japanese STS field. Hence, I suggest that it has added to and enriched what Kanamori (2013) originally achieved.

References

- Anderson, Benedict. 1991. *Imagined Communities: Reflections on the Origin and Spread of Nationalism*. London: Verso.
- Asai, Atsushi 浅井篤. 2011. "Gataka." *JIM* 21, no. 11: 945.

- Bai, Kouichi 俵孝一. 1968. "Sinzo ishoku heno houteki teigen" 心臓移植への法的提言 ("A Legal Suggestion for Heart Transplantation"). *Asahi Journal* 10, no. 3: 18–22.
- Bai, Kouichi. 1983a. "Hohoron teki kento ni mukete" 方法論的検討に向けて ("Consideration toward the Procedure of Legislation"). In *Noshi to Shinzoshi no Hazama de: shi no hnantei wo megutte* 脳死と心臓死の間で—死の判定をめぐる (Gap between Brain-Death and Cardiac-Death: Reflection on How to Judge and Determine Death), edited by Japan Transplant Society, 73–83. Tokyo: Medical Friends.
- Bai, Kouichi. 1983b. "'Noshi ron' no tomen suru shomondai" 脳死論の当面する諸問題 ("Various [Socio-political] Issues Arising from the [Legal] Reflections over Brain-Death"). *Jiyu to Seigi* 自由と正義 (*Liberty and Justice*) 37, no. 7: 14–23.
- Ban, Toshio 伴敏夫, and Tezuka Productions 手塚プロダクション. 1994a. *Teduka Osamu monogatari 1928–1959* 手塚治虫物語1928–1959 (*Biography of Tezuka Osamu 1928–1959*). Tokyo: Asahi Shinbun-sha.
- Ban, Toshio 伴敏夫, and Tezuka Productions 手塚プロダクション. 1994b. *Teduka Osamu monogatari 1960–1999* 手塚治虫物語 1960–1999 (*Biography of Tezuka Osamu 1960–1999*). Tokyo: Asahi Shinbun-sha.
- Braden, James. 1994. "'Introduction to Noh,' in Noh and Kabuki." In *Staging Japanese Theatre: Noh and Kabuki*, edited by John Mitchell and Miyako Watanabe, i–iii. New York: Fordham University Press.
- Baudrillard, Jean. (1976) 1993. *Symbolic Exchange and Death*, translated by Iain Hamilton Grant. London: Sage Publications.
- Brophy, Philip. 2000. "Monster Island: Godzilla and Japanese Sci-Fi/Horror/Fantasy." *Postcolonial Studies: Culture, Politics, Economy* 3, no. 1: 39–42.
- Chambers, Tod. 2016. "Eating One's Friends: Fiction as Argument in Bioethics." *Literature and Medicine* 34, no. 1: 79–105.
- Chan, Sarah. 2009. "More than Cautionary Tales: The Role of Fiction in Bioethics." *Journal of Medical Ethics* 35, no. 7: 398–99. doi.org/10.1136/jme.2009.031252.
- Cho, Byung-Sun 趙炳宣. 2003. "Nihon to kankoku no zoki ishoku ho ni kansuru hikaku- hoteki kosatsu: Atarashii zoki ishoku-jutsu no hatten ni tomonau iryo rinri-teki ho-tetsugaku-teki approach wo chushin ni" 日本と韓国の臓器移植法に関する比較法的考察:新しい臓器移植術の発展に伴う医療倫理的・法哲学的アプローチを中心に ("Comparative Analysis of the Korean and Japanese Organ Transplantation Acts: Medical Ethical and Jurisprudential Approaches toward the Issues Arising from New Transplant Technologies"). In *Zoki ishoku to seimei rinri* 臓器移植と生命倫理 (*Organ Transplantation and Bioethics*), edited by Takeshi Kuramochi 倉持武 and T. Nagashima 長島隆, 46–83. Tokyo: Taiyo Shuppan.
- Czarny, Matthew J., Ruth R. Faden, and Jeremy Sugarman. 2010. "Bioethics and Professionalism in Popular Television Medical Dramas." *Journal of Medical Ethics* 34, no. 6: 203–6.
- Fisch, Michael. 2000. "Nation, War, and Japan's Future in the Science Fiction 'Anime' Film 'Patlabor II.'" *Science Fiction Studies* 27, no. 1: 49–68.
- Fujigaki, Yuko 藤垣裕子. 2013. "Kagaku-gijutsu-shakai-ron karamita genpatsu-jiko no media hodo no mondaiten" 科学技術社会論からみた原発事故のメディア報道の問題点 ("Problems in Media Coverage on Nuclear Disaster—from STS Perspectives"). *Gakujutsu no doko* 学術の動向 (*Academic Trends*) 18, no. 1: 46–49.
- Gellner, Ernest. 1983. *Nations and Nationalism*. Ithaca, NY: Cornell University Press.
- Gibson, Alicia. 2013. "Out of Death, an Atomic Consecration to Life: Astro Boy and Hiroshima's Long Shadow." In *Mechademia* 8, edited by Frenchy Lunning, 313–20. Minneapolis: University of Minnesota Press.
- Gilpin, Caroline Crosson. 2017. "Teaching 'Frankenstein' with the New York Times." *New York Times*, 15 February. www.nytimes.com/2017/02/15/learning/lesson-plans/teaching-frankenstein-with-the-new-york-times.html.
- Gurnham, David. 2012. "Bioethics as Science Fiction: Making Sense of Habermas's The Future of Human Nature." *Cambridge Quarterly of Healthcare Ethics* 21, no. 2: 235–46.
- Hagiwara, Yuuki 萩原優騎. 2001. "Jiko kettei-ken no datsu-kochiku: Noshi zoki-ishoku mondai wo chusin toshite" 自己決定権論争の脱構築: 脳死・臓器移植問題を中心として ("Deconstruction of the Concept of Self-Determination/Autonomy: Focusing on the Issues in Relation with Brain-Death and Organ Transplantation"). *Gendai Bunmei-gaku Kenkyu* 現代文明学研究 (*Modern Civilization Research*) 4: 264–96.
- Hall, Stuart. 1997. "The Spectacle of the 'Other.'" In *Representation*, edited by Stuart Hall, 223–336. London: Sage Publications.
- Hall, Stuart. 2001. "The Question of Cultural Identity." In *Modernity and Its Futures*, edited by Stuart Hall, D. Held, and T. McGrew, 273–316. Cambridge: Polity Press.

- Harris, John. 2006. *The Traditional Theatre of Japan: Kyogen, Noh, Kabuki and Puppetry*. Lewiston, NY: Edwin Mellen Press.
- Higa, Norie. 1996. "A Report on Nurse's Consciousness of Death." *Sizuoka Kenritsu Daigakubu Kiyo* 静岡 県立大学短期大学部紀要 (*Proceedings of Jr College at the University of Shizuoka*) 10: 217–28.
- Hobsbawm, Eric. 1983a. "Introduction: Inventing Traditions." In *The Invention of Tradition*, edited by Eric Hobsbawm and T. Ranger, 1–14. Cambridge: Cambridge University Press.
- Hobsbawm, Eric. 1983b. "Mass-Producing Traditions: Europe, 1870–1914." In *The Invention of Tradition*, edited by Eric Hobsbawm and T. Ranger, 263–308. Cambridge: Cambridge University Press.
- Horinouchi, Yoichi 堀之内洋一. 2012. "'Shakai-teki seishin' ni tsuite: 3.11 izen to iko" 「社会的精神」について: 3.11 以前と以降 ("On 'Social Ethos': Pre and Post 3.11"). *Citizen's Science* 4: 39–48.
- Inoue, Hiraku 井上啓. 2012. "Shimindantai niyoru hoshiyasen sokutei no genjo to kadai" 市民団体による放射能測定の現状と課題 ("The Status Quo and Project of Monitoring/Measuring the Radiation Level by Citizen Groups"). *Kagaku-bushitsu to kankyo* 化学物質と環境 (*Chemicals and Environment*) 115: 13–15.
- Itsuki, Nathumi 樹なつみ. 1990a. *Oz*. Vol. 1. Tokyo: Hakusen-sha.
- Itsuki, Nathumi 樹なつみ. 1990b. *Oz*. Vol. 2. Tokyo: Hakusen-sha.
- Itsuki, Nathumi 樹なつみ. 1991. *Oz*. Vol. 3. Tokyo: Hakusen-sha.
- Itsuki, Nathumi 樹なつみ. 1992. *Oz*. Vol. 4. Tokyo: Hakusen-sha.
- Iwabuchi, Koichi. 2002. "'Soft' Nationalism and Narcissism: Japanese Popular Culture Goes Global." *Asian Studies Review* 26, no. 4: 447–69.
- Iwabuchi, Koichi. 2015. *Resilient Borders and Cultural Diversity: Internationalism, Brand Nationalism, and Multiculturalism in Japan*. Lanham, MD: Lexington Books.
- Kanamori, Osamu. 2013. "Kyoko ni shoshyasareru seimeirinri" 虚構に照射される生命倫理 ("Bioethics, Illuminated by Fictional Stories"). In *Seimeirinri no frontier* 生命倫理のフロンティア (*Frontiers in Bioethics*), edited by Go Awaya 粟屋剛 and Osamu Kanamori 金森修, 1–29. Tokyo: Maruzen-shuppan.
- Kim, Dong-won. 2018. "Science Fiction in South and North Korea: Reading Science and Technology as Fantasized in Cultures." *East Asian Science, Technology and Society* 12, no. 3: 309–26.
- Kirby, David A. 2004. "Extrapolating Race in GATTACA: Genetic Passing, Identity, and the Science of Race." *Literature and Medicine* 23, no. 1: 184–200.
- Kiyohara, Yuu 清原悠. 2017. "'Genpatsujikohisaichi/hisaisha' wo darega kimeruno-ka? 'Hoshiyanoosen no waishoka' ni taiko-suru, shimin-hoshano-sokuteijo no 'dojo-osen chosa' ni chakumoku-shi te" 「原発事故被災地・被災者」を誰が決めるのか?: 「放射能汚染の矮小化」に対抗する、市民放射能測定所の「土壌汚染調査」に着目して ("Who Could Define the 'Victim' and 'Contaminated Area' of the Nuclear Disaster: Focusing on the 'Investigation Outcome of Soil Contamination,' Produced by Citizen Radiation Monitoring Group that Has Fights against the Ongoing [Authority's] 'Attempts to Distort and Minimize the Level of Nuclear Contamination'"). *Sustainability kenkyu* サステイナビリティ研究 (*Research for Sustainability*) 7: 59–76.
- Komatsu, Yoshihiko 小松美彦. 1996. *Shi wa kyomei suru* 共鳴する死 (*Resonance with Death*). Tokyo: Keiso Shobou.
- Kovacic, Mateja. 2018. "The Making of National Robot History in Japan: *Monozukuri*, Enculturation and Cultural Lineage of Robots." *Critical Asian Studies* 50, no. 4: 572–90. doi.org/10.1080/14672715.2018.1512003.
- Kure, Tomofusa 呉智英. 1997. *Gendai manga no zentaizo* 現代マンガの全体像 (*Overview of the Contemporary Manga*). Tokyo: Futaba-sha.
- Li, Carl K. 2016. "Visualizing Emotion and Seeing Change in Science Fiction Manga: Political Potential in the Expression of Emotion in 7 Billion Needles." *Japan Forum* 28, no. 4: 413–38.
- Li, Carl K. 2017. "How Does the Radiation Make You Feel? The Emotional Criticism of Nuclear Power in the Science Fiction Manga *Coppelion*." *Journal of Graphic Novels and Comics* 8, no. 1: 33–45.
- Lock, Margaret. 2002. *Twice Dead: Organ Transplants and the Reinvention of Death*. Berkeley: University of California Press.
- Low, Morris. 2003. "Displaying the Future: Techno-nationalism and the Rise of the Consumer in Postwar Japan." *History and Technology* 19, no. 3: 197–209.
- Makiyama, Yasushi 牧山康志. 2005. "Zoki ishoku wo jirei to suru kagaku gijutsu no shakai-teki governance no kento: Chukan-teki senmon-kikan no juyosei" 臓器移植を事例とする科学技術の社会的ガバナンスの検討: 中間的専門機関の重要性 ("Analysis of Social Governance upon Technology, the Case of Organ Transplant in Particular: The Importance of a Special Agency That Acts as a Mediator and Organizer"). In *Policy Study No. 10*, edited by 2nd Policy Oriented Research Group. Tokyo: National Institute of Science and Technology Policy. www.nistep.go.jp/achievements/jpn/pol010j/pdf/pol010j.pdf (accessed 24 March 2006).

- Minority Opinion from *Rinji Noshi oyobi Zoukiishoku Chousa-kai* 臨時脳死及び臓器移植調査会 (*Ad Hoc Cabinet Committee on Brain Death and Organ Transplantation*). 1991. *Noshi oyobi Zoukiishoku ni kansuru Juyo Jiko Nitsuite: Chukan Iken* 脳死及び臓器移植に関する事項について中間意見 (*On Brain-Death and Organ Transplantation, the Mid-term Report*). In *Noushi to Zoukiishoku* 脳死と臓器移植 (*Brain Death and Organ Transplantation*), edited by Takeshi Umehara, 352–81. Japan: Asahi-Shinbun Sha.
- Minority Opinion from *Rinji Noshi oyobi Zoukiishoku Chousa-kai* 臨時脳死及び臓器移植調査会 (*Ad Hoc Cabinet Committee on Brain Death and Organ Transplantation*). 1992. *Noshi oyobi Zoukiishoku ni kansuru Juyo jiko nitsuite* 脳死及び臓器移植に関する事項について (*On Brain-Death and Organ Transplantation*). In *Noshi Rincho Hihan* 脳死臨調批判 (*Critique against the Ad Hoc Committee on Brain Death*), edited by T. Tachibana, 279–325. Tokyo: Chuokoron-Sha.
- Mirenayat, Sayyed Ali, Ida Baizura Bahar, Rosli Talif, and Manimangai Mani. 2017. “Beyond Human Boundaries: Variations of Human Transformation in Science Fiction.” *Theory and Practice in Language Studies* 7, no. 4: 264–72.
- Miyadai, Shinji 宮台真司. 1996. “Shi no jikokettei: ko no sentaku he hirakareta michi wo” 死の自己決定—個の選択へ開かれた道— (“For Self-Determination/Autonomy upon One’s Own Death [and Death-Bed Care]”). *Asahi*, 28 August.
- Morioka, Masahiro 森岡正博. (1989) 1991. *Noushi no hito* 脳死の人 (*Brain-Dead Person*). Tokyo: Hukutake Shoten.
- Nakayama, Kenich 中山研一. 1995. *Noshi ishoku rippo no arikata: Ho-an no keii to naiyo* 脳死移植立法のあり方: 法案の経緯と内容 (*On the [Ongoing] Legislation Process for Organ Transplantation Act: Its Backgrounds and Content*). Tokyo: Seibun-do.
- Napier, Susan J. 2005. *Anime from Akira to Howl’s Moving Castle: Experiencing Contemporary Japanese Animation*. New York: Palgrave Macmillan.
- Natsume, Fusanosuke 夏目房之介. (1989) 1995a. “Tezuka Osamu no sekai 手塚治虫の世界 (*The World [That Was Constructed by] Tezuka Osamu*).” In *Tezuka Osamu ha dokoni iru* 手塚治虫はどこにいる (*Where Can We Find Tezuka Osamu?*), 9–12. Tokyo: Chikuma Shobo.
- Natsume, Fusanosuke. 1995b. *Tezuka Osamu ha dokoni iru* 手塚治虫はどこにいる (*Where Can We Find Tezuka Osamu?*). Tokyo: Chikuma Shobo.
- Natsume, Fusanosuke. 1998. *Tezuka Osamu no boken* 手塚治虫の冒険 (*Adventures of Osamu Tezuka*). Tokyo: Shogaku-kan.
- Ndalianis, Angela. 2013. “Astro Boy, Science-Fictionality and Japanese Robotics.” *Deletion: The Open Access Online Forum in Science Fiction Studies* 1, 30 August. www.deletionscifi.org/episodes/episode-1/astro-boy-science-fictionality-and-japanese-robotics/.
- Nitto, Hiroyuki, Disuke Taniyama, and Hitomi Inagaki. 2017. “Social Acceptance and Impact of Robots and Artificial Intelligence: Findings of Survey in Japan, the US and Germany.” *NRI Papers (Japan)* 213, 1 February. www.nri.com/en/knowledge/report/1st/2017/cc/papers/0201.
- Orbaugh, Sharalyn. 2011. “Manga and Anime.” In *The Routledge Companion to Science Fiction*, edited by Mark Bould et al., 112–22. Oxford: Routledge.
- Oshii, Mamoru 押井守. 1995. *Koukaku Kidotai* 攻殻機動隊 (*Ghost in the Shell*). Tokyo: Kodan-sha.
- Pethes, Nicolas. 2005. “Terminal Men: Biotechnological Experimentation and the Reshaping of ‘the Human’ in Medical Thrillers.” *New Literary History* 36, no. 2: 161–85.
- Rath, Eric. 1997. *Actors of Influence: Discourse and Institutional Growth in the History of Noh Theatre*. Ann Arbor: University of Michigan Press.
- Robertson, Jennifer. 2007. “Robo Sapiens Japonicus: Humanoid Robots and the Posthuman Family.” *Critical Asian Studies* 39, no. 3: 369–98.
- Robertson, Jennifer. 2014. “Human Rights vs. Robot Rights: Forecasts from Japan.” *Critical Asian Studies* 46, no. 4: 571–98.
- Romain, Alex. 2010. “Medicine in Science Fiction: How Hollywood Has Predicted the Future.” *Student BMJ* 18: c5057. student.bmj.com/student/view-article.html?id=sbmj.c5057.
- Sakurai, Tetuso 桜井哲夫. 1990. *Tezuka Osamu* 手塚治虫. Tokyo: Kodan-sha.
- Sasaki, Kaori. 2006a. *Politicised Culture, Culturalised Life and Death: The Japanese Organ Transplantation and Brain Death Debates*. PhD diss., Lancaster University.
- Sasaki, Kaori 佐々木香織. 2006b. “Iryo niokeru ‘mitori’ toiu ‘bunka’ kachi no keisei: Mitori no iryoka to nichibei-sai” 医療における「看取り」という文化価値の形成: 看取りの医療化と日米差異 (“Medicalization of Deathbed Care; Cultural Values in the Provision of Deathbed Care, *Mitori*, at Hospitals: Construction of the Difference between Japan and America”). In *Nichibei iryo hikaku monograph series* 4 日米医療比較モノグラフシリーズ 4 (*Monograph Series on Comparative Analysis between America and Japan in Medicine* 4), edited by Yoneyuki Sugita 杉田米行, 1–24. Tokyo: Architect.

- Schilling, Mark. 1993. "Doraemon: Making Dreams Come True." *Japan Quarterly* 40, no. 4: 405–17.
- Schodt, Frederik L. 2007. *The Astro Boy Essays: Osamu Tezuka, Mighty Atom, and the Manga/Anime Revolution*. Albany, CA: Stone Bridge Press.
- Shimizu, Reiko 清水玲子. (1992) 1994. 22xx. Tokyo: Hakusen-sha.
- Shirow, Masamune 士郎正宗. (1991) 2002. *Bilingual ban kokaku kido tai* バイリンガル版攻殻機動隊 (*The Ghost in the Shell*), translated by F. L. Schodt. Tokyo: Kodansha International.
- Smith, Anthony D. 1986. *Ethnic Origins of Nations*. Oxford, UK: Blackwell Publishers.
- Sone, Yuji (2008). "Realism of the Unreal: The Japanese Robot and the Performance of Representation." *Visual Communication* 4, no. 3: 345–62. doi.org/10.1177/1470357208092324.
- Tada, Tomio 多田富雄. 1991. "Noshi to gendaijin no shiseikan" 脳死と現代人の死生観 ("Brain-Death and Contemporary Views of the Matter of Life and Death among the Population"). *Nihon ishikai zasshi* 日本医師会雑誌 (*The Journal of the Japan Medical Association*) 105, no. 7: 1128–31.
- Tada, Tomio 多田富雄. 1992. "Shinsaku Noh, Mumyo no i" 新作能—無明の井 ("The New Noh Play, Mumyo no i"). In *Noushi to zouki ishoku* 脳死と臓器移植 (*Brain-Death and Organ Transplantation*), edited by Takeshi Umehara 梅原猛, 319–36. Tokyo: Asahi Shinbun-sha.
- Tada, Tomio 多田富雄, Hiroyuki Itsuki 五木寛之, and Michi Nakajima 中島みち. 1994. "Aimaini natta sei to shi no kyokaisen" あいまいになった生と死の境界線 ("The Boundary between Life and Death Has Become Ambiguous"). In *"Noshi jidai" no ikikata shinikata* 脳死時代の生き方死に方 (*The Way to Live, the Way to Die, in "the Era of Brain-Death"*), edited by Michi Nakajima 中島みち, 1–20. Tokyo: Jiji Tsushin-sha.
- Tanahashi, Minoru 棚橋實, et al. 1999 *Ninin-sho no shi: Saiai no hito no shi wo do toraeruka* 二人称の死: 最愛の人の死をどうとらえるか (*Thy Death: How Should We Treat Our Beloved Person's Death?*). Tokyo: Keisei-sha.
- Tateiwa, Shinya 立岩信也. 1997. *Shiteki shoyu-ron* 私的所有論 (*On Private Property*). Tokyo: Keiso Shobo.
- Tezuka, Osamu 手塚治虫. 1997. *Boku no manga jinsei* ぼくのマンガ人生 (*My Life with Manga*). Tokyo: Iwanami Shoten.
- Tezuka, Osamu 手塚治虫. 2000. *Bokuha mangaka* ぼくはマンガ家 (*I Am a Manga Writer*). Tokyo: Kadokawa Shoten.
- Tsuchiura Machizukuri Shimin-no-kai. 2013. *Tsuchiura no hoshano wo hakaru: Shimin niyoru hoshyasen sokutei-katsudo hokokusho* 土浦の放射能を測る: 市民による放射線測定活動報告書 (*Measuring the Radiation Level at Tsuchiura: Report on Citizen Activity of Measuring/Monitoring the Radiation Level*). Tsuchiura: Tsuchiura Machizukuri Shimin-no-kai.
- Tsujikawa, Norifumi 辻川典文. 2016. "Citizen Participation in Nuclear Energy Issues." *Review of Kobe Shinwa Women's University* 49: 29–39.
- Tsukahara, Togo 塚原東吾. 2016. "Nihontekina STS no positioning, STSaha, shuryuha, ishikiteki-seisakutekiou-gakuha nadono keisei" 日本のSTSのポジショニング: STS 左派、主流派、意識的政策研究適応学派などの形成 ("Juxtaposing Various Sociopolitical Positioning by Japanese STS Scholars: Formation of the Left, Mainstream, the Attuned Themselves to Policymakers' Standpoints and so on"). Paper presented at the 15th Annual Meeting of the Japanese Society for Science and Technology Studies, University of Hokkaido, Hokkaido, 5–6 November.
- Yanagida, Kunio 柳田邦男. 1995a. *Gisei: Waga musuko, noshi no 11 nichi* 犠牲: わが息子・脳死の11日 (*Sacrifice: 11 Days with My Brain-Dead Son*). Tokyo: Bungei Shunju.
- Yanagida, Kunio 柳田邦男. 1995b. "Noshi, watashi no teigen" 脳死、私の提言 ("Brain-Death, My Recommendation of [How It Should Be Defined]"). *Bungei Shunju* 文藝春秋 73, no. 4–5: 164–79.
- Yanagida, Kunio 柳田邦男. 1998. "Gisei" heno tegami 「犠牲」への手紙 (*Letters, Responses [from the Readers] of 'Sacrifice'*). Tokyo: Bungei Shunju.
- Yashiro, Yoshimi 八代嘉美. 2007. "SF to kisoigaku-kenkyu: kansaibo-kenkyu wo chushin ni" SFと基礎医学研究~幹細胞研究を中心に~ ("Sci-Fi and Basic Medical Research: Focusing on Stem-Cell Research"). *Seibutsugaku-shi kenkyu* 生物学史研究 (*Research on History of Biology*) 79: 66–69.

Kaori Sasaki is an associate professor at Otaru University of Commerce after working as a research associate at Imperial College London, where she participated in a research project concerning the public understanding of electronic patient records in the United Kingdom. Obtaining Japanese public funding, she has been exploring the development of biopolitics and cultural politics vis-à-vis the current expansion of the usage of electronic health records in Japan. Her postdoctoral and PhD research covered Japanese public debates over the new definition of death and organ transplantation from brain-dead donors.