

Stem Cell Science and its Public: The Case of Singapore

W. Calvin Ho · Benjamin Capps · Teck Chuan Voo

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Abstract In this paper, we attempt to elucidate a “public” that has emerged in response to the work of the Bioethics Advisory Committee (BAC)—an expert body appointed by the Singapore Government—that culminated in the publication of two reports relating to stem cell science and technology. We follow Annelise Riles in explicating a recursive form from which both the “public” and stem cell science and technology draw reference in their co-production. In this regard, we borrow Sheila Jasanoff’s terminology of “civic epistemology” in explicating this form, with focus on the practices institutionalised in the BAC and the ways in which knowledge claims are presented, tested and put to use in the public domain. We further attempt to provide an analysis of particular ethical constructs (such as “embryo” and “egg”) that have emerged. In so doing, we illustrate the development and refinement of a “civic epistemology” since 2001 whilst setting out the current ethical landscape in Singapore.

All views are personal to the authors and may not represent those of their respective institutions. All errors are the authors’.

W. C. Ho (✉)

Secretariat, Bioethics Advisory Committee, Singapore, Singapore
e-mail: calvin_ho@bioethics-singapore.org

W. C. Ho

School of Law, Cornell University, Ithaca, NY, USA

W. C. Ho

King’s College, University of Cambridge, Cambridge, UK

B. Capps · T. C. Voo

Centre for Biomedical Ethics, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore

B. Capps

e-mail: medbjc@nus.edu.sg

T. C. Voo

e-mail: medvtc@nus.edu.sg

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In 1988, the Economic Development Board was charged with the development of Singapore's biotech industry. Investment was initially designated to develop an international pharmaceuticals and diagnostics industry and to foster the productive capacity of the agricultural and food technologies within the state. Measures were also proposed to address the lack of qualified scientists through education initiatives, to identify and address the causes of the current brain drain and to attract foreign businesses through financial incentives and a supportive research environment (for example, building designated science parks and an advanced transport and communications infrastructure). These initiatives would be in partnership with the government and the universities under the so-called triple-helix model (Wong 2007).

Early initiatives to promote technological advancement were revitalised in 1999 with renewed emphasis on knowledge-driven industries. Biotechnology was identified as one of the four pillars of investment (the others being electronics, information and petrochemical industries). Within the "economic pillar" of biotechnology, human health-related life sciences were earmarked, and the drive was to focus on and capture the international healthcare niche (Heng 2008; McMurray 2009). The Agency for Science, Technology and Research (A*STAR)—the main funding arm of the Singapore government for biomedical research—was given the responsibility of directing the biomedical future of Singapore. Geographically, the "one-north" project gives physical embodiment to a (re)articulation of the nation's new-economy, with focus on entrepreneurship, creativity and flexibility as critical values to inculcate (Wong and Bunnell 2006: 72).

The need to establish a legal and regulatory climate that enables this relatively new investment initiative to flourish was identified early on in the policy process, perhaps due in part to past experience in successfully developing Singapore's capabilities in manufacturing and financial services. The advice of leading scientists on high-level advisory bodies, such as the Biomedical Sciences International Advisory Council, has also been a source of influence.¹ The credibility of Singapore's status as a centre for biomedical research and its capacity to attract and retain scientific talent depend, to no small extent, on its reputation as an ethically sound environment within which scientific facticity is generated. Hence, within a short time from which the Biomedical Sciences Initiative was taken up, the Bioethics Advisory Committee (BAC) was established by the Cabinet in December 2000 to provide the government with advice on ethical, legal and social issues arising from biomedical research (Lim and Ho 2008). This decision to set up a national ethics body was in turn influenced by a number of factors, including the experiences of other common law countries (especially those of Britain and the USA) with which Singapore shares a political and legal tradition,² and by the fact that the ethical

¹ The composition and role of the International Advisory Council are set out in a speech by Dr. Tony Tan Keng Yam; available at <http://stars.nhb.gov.sg/stars/public/viewHTML.jsp?pdfno-2002102802> (last visited 7 December 2009).

² Sheila Jasanoff (2005) provides an instructive discussion of the bioethical experiences in Britain and in the USA vis-à-vis the embryo in reproductive technology (see pp. 147–158; 164–170).

governance of research did not fall clearly within the remit of existing political and social agencies.³

In this paper, we attempt to elucidate a “public” that has emerged in response to the work of the BAC that culminated in the publication of two reports relating to stem cell science and technology: *Ethical, Legal and Social Issues in Human Stem Cell Research, Reproductive and Therapeutic Cloning* (2002a; hereafter, the “SC Report”) and *Donation of Human Eggs for Research* (2008c; hereafter, the “ED Report”). Much like the Pacific Women’s Information/Communication Network (PAWORNET) in Annelise Riles’s study, the emergent Singaporean “public” presented and conducted themselves as “a limited circle rather than an outreaching star” (Riles 2001: 113). This contradicts the popular imagination that a “public” is some free-floating idealised way that the state relates or ought to relate to its citizens. During the public consultation in 2001, a core group of religious, healthcare and professional bodies actively engaged with the BAC in the formulation of recommendations that were subsequently published in the SC Report. Whilst some views from individuals were received, they nevertheless articulated institutional (mainly religious) views, albeit in an individual capacity. During a more recent public consultation that culminated in the ED Report, the number of individual responses increased, although many of whom continued to articulate institutional (again, mainly religious) viewpoints. Interestingly, the core group of institutions not only remained active but also revealed greater sophistication and depth in ethical evaluation, especially in the proliferation of ethical “forms” (discussed below). It is this institutional core and, to some extent, individual participants that have emerged as the “public” vis-à-vis the shaping of stem cell policies in Singapore. This phenomenon lends support to what Maarten Hajer argues as network governance, although its demarcation from the classical modernist conceptualisations of governance may not be as clear-cut as he suggests (Hajer 2009: 170–175).

In addition, we follow Riles in explicating a recursive form from which the “public” as a repository of values, the BAC as an expert body and stem cell science and technology draw reference in their co-production. In this regard, we borrow Sheila Jasanoff’s terminology of “civic epistemology” in explicating this form (Jasanoff 2005: 255, 258). We focus on the practices institutionalised in the BAC and the ways in which knowledge claims are presented, tested and put to use in the interactions between the BAC and its “public”. A detailed inquiry into the key components of this recursive form (which Jasanoff specifies in her research as six interrelated dimensions) is beyond the scope of this paper, but we attempt to provide an analysis of particular ethical constructs (such as “embryo” and “egg”) that have emerged from the SC Report and the ED Report. In so doing, we attempt to illustrate the development and refinement of this “civic epistemology” since 2001 whilst setting out the current ethical landscape in Singapore vis-à-vis stem cell science and

³ The information set out in this paragraph is drawn from an ethnographic study carried out by Ho, W.-C. (one of the contributors to this paper) from October 2007 to October 2008 on the work of the BAC.

technology. We further argue that it is not helpful to distinguish between local perspectives with presumably more Westernised elite perspectives. Whilst it is true that many members of the BAC were trained in essentially Western traditions and that many of the key institutions in Singapore were modelled after those in Britain, the recommendations of the BAC are situated in the sense that they have to suit local conditions. We also found no clear evidence of the subjugation of a local perspective by an elite one other than an explicit preference for enabling a diversity of views over dogmatism.

1 The Stem Cell Report and its Civic Epistemology

The isolation of human embryonic stem (hES) cells in 1998 by Thomson et al. (1998) had been widely acknowledged as a potentially momentous moment in medical science. Many scientists, aware of the culture of ‘hype and hope’ being encouraged, presented a moderate, balanced view, stressing that treatments would be many years away and would involve a great deal of investment of time and money (Thomson 2001). Others were more concerned because embryonic stem cells came from human embryos, and for some, this was an unacceptable use of human life and should be prohibited. They were not against stem cell research per se, and they pointed towards the “ethical alternative” of “adult” stem cells and, most recently, induced pluripotent stem cells (iPSC; Takahashi et al. 2007; Yu et al. 2007; Hyun 2008).

There was no specific regulatory framework for embryo research prior to the publication of the SC Report. However, due to the rapid developments in the field and the public interest it has drawn, a comprehensive and formal assessment as to its ethical, legal and social implications was deemed necessary in order to enable the science to move forward. To this end, the Human Stem Cell Research (HSR) Subcommittee was appointed by the BAC in February 2001 to develop a set of recommendations on stem cell research and cloning. Being the first subject matter to be deliberated on by the BAC, stem cell science came to symbolise Singapore’s push towards excellence in biomedical technology. It also influenced the BAC’s approach to subsequent ethical discussions and deliberations. These recommendations of the BAC are responsible not only for shaping how stem cell science is conducted within the city state but also how local science would integrate with international research developments. To formulate socially acceptable guidelines, it is necessary to align and address the concerns of the various ethnic and religious communities which make up the Singaporean population. One view is that a *moderate majority opinion* identifies the “tolerable limits” of the diverse views of its ethnic and religious communities, without being characterised by a single perspective. This was achieved, as discussed below, by promoting an idea of the “common good” (Lim and Ho 2003).

The preparation for the SC Report followed the remit of a number of other national consultations occurring in that period. Significantly, the focus of stem cell research *at that time* was almost exclusively on the potential of hES cells and their comparative utility compared with “adult” stem cells. Furthermore, there was a great emphasis on the potential for “therapeutic” cloning, or somatic cell nuclear

transfer (SCNT),⁴ to overcome immunological limitations of hES cells. Although it was possible to isolate embryonic *germ* cells from the gonad tissue of aborted fetuses (their successful isolation and characterisation was almost simultaneously reported), it was decided that the ethical implications were adequately covered by existing abortion regulations.⁵ Most permissive jurisdictions, including Singapore, have persevered with pro-hES cell research policies because scientific opinion could not confidently show that embryo research was no longer necessary (UK House of Lords 2002). This stance, as we shall see, remains unchanged in spite of the more recent challenge posed to hES cell research by iPSC technology. The International Society for Stem Cell Research provides convincing arguments that SCNT and iPSC are complementary technologies in the broader scheme of nuclear reprogramming (International Society for Stem Cell Research 2009).

The key issues that framed the deliberative scope of the HSR Subcommittee were categorised as either scientific or ethical, of which the latter encompassed legal and social issues as well (Bioethics Advisory Committee 2002a: Annex D). A number of these issues were identical to those considered in other jurisdictions such as the UK and the USA. Other issues, especially those relating to regulation, have a more local character. Seven expert papers were commissioned to assist the HSR Subcommittee in better understanding the issues and possible ways by which they could be addressed (Bioethics Advisory Committee 2002a: Annex E).

In November 2001, a consultation paper on human stem cell research and cloning was released to 39 religious and professional groups. Of these, written submissions were received from 11 religious groups, three medical or healthcare institutions, seven professional bodies and four research institutions. The religious groups were mostly opposed to hES cell research and therapeutic cloning, whereas research institutions expressed support for it. The medical or healthcare institutions and professional bodies were either evenly divided on the subject or did not state a position. Efforts were also made to engage with the broader public. A focus group discussion that comprised 39 participants was held on 7 December 2001, and a summary of the discussion has been published as an annex to the SC Report (Bioethics Advisory Committee 2002a: Annex I). In addition, three dialogue sessions were held on 27 December 2001, 3 January 2002 and 7 January 2002 (Bioethics Advisory Committee 2002a: Annex I), along with three press briefings to keep the public informed of developments. Comments from the public were also received through the web site, although they have not been documented in the SC Report. From the feedback received, the views of

⁴ Therapeutic cloning was made famous (or perhaps infamous) by the creation of Dolly the sheep. She was created using a method called cell nuclear replacement (CNR) or SCNT (see Wilmut et al. 1997).

⁵ In the SC Report, it is noted that elective abortion is permitted in Singapore subject to the *Termination of Pregnancies Act* (Singapore 1985) and that the abortion process was beyond the scope of the SC Report. One may argue (but the SC Report is silent on this) that the tissue will be available after a legal abortion regardless and therefore could be put to a worthwhile purpose subject to an effective consent. The SC Report does note that such tissue can be legally donated for research.

major religious institutions in Singapore are summarised as follows (see Lim and Ho 2003):

Religious group	Embryonic stem cell research	Therapeutic cloning	Reproductive cloning
Baha'I	Case-by-case as "the exact moment and nature of events in conception is a mystery".		
Buddhist	For	For	Against
Catholic	Against	Against	Against
Christian	Against	Against	Against
Hindu	For	No specific comment received	No specific comment received
Jew	For	Unclear	No specific comment received
Muslim	For	For	Against
Sikh	Against	Against	Against
Taoist	Against	Against	Against

As an expert policy body, it was necessary for the BAC to find commonality that could "bridge" conflicting and often irreconcilable views on embryo research and cloning. This required the BAC to function, to some degree, as an interpretive mediator. The development of the sciences on the one hand and moral theology on the other has become so "specialised" that each has evolved into an institutional culture so distinct from the other that there is no common "language" that may be adopted for members of one institutional culture to communicate with members of the other. In this regard, John Polkinghorne (1998: 27–39), provides a good illustration: the study of cause and effect is undertaken in physics (in the field of quantum physics) as well as in theology (in the doctrine of divine causality). However, the institutional culture within which this concept is developed has become so remarkably technical that only experts in each field will appreciate fully the consequences of the study. It is unrealistic, assuming that it is practicable, for members of one institutional culture to become fully acquainted with the language and practices of another institutional culture in order for a meaningful discussion on hES cell research to take place. Even less realistic is for any one institution to forsake its own institutional culture and adopt that of the other for the purposes of effecting dialogue. Appreciating this difficulty, the BAC formulated a moderate position that did not give preference to any particular perspective. The SC Report generally described the moderation process that was applied to religious views on the point of ensoulment of an embryo (2002a: Chapter 7). These views were further moderated by, among other factors, the population of believers in Singapore (a majority of whom was Buddhists).

Fischer (2003: 6), correctly notes that the role of policy analysts requires more of them than being mere interpreters. The moderation process involves a critical reflective orientation that is necessary to guard against singular ideological domination and dogmatism. This critical reflective orientation provides the dialectical foundations of interaction between contending institutional thoughts on the discursive platform of a greater cultural context. Arguably, this moderation process gave rise to a "civic epistemology", or a means by which the broader

cultures and practices of knowledge are produced and validated as characteristics of public life and civic institutions in modern democratic societies. The commonality that the BAC constructed to overcome the selective deafness of competing institutions revolved around two principles—"just" outcome and "sustainable" in consequence. The BAC indicates that the "just" element is not merely consequential. It possessed substantive (albeit utilitarian) content in that there is an obligation on the part of all institutions to respect the common good, particularly in the sharing of the costs and benefits. In "sustainable", the BAC also recognises the obligation to respect the needs of generations yet unborn. Taken together, the BAC considers the best way forward to be one that allows the pursuit of social benefit but in a manner that either avoids or ameliorates potential harm.

The BAC proposes certain "respect" affirming limitations to research: that it should only take place "when there is very strong scientific merit in and potential medical benefit" (Bioethics Advisory Committee 2002a: v) and that embryos after 14 days of development should no longer be available for research. As long as these constraints were met, it was possible to use surplus embryos for research because "rather than allow them to perish, their use in research which would serve a greater good is not lacking in respect" (Bioethics Advisory Committee 2002a: v). It also sanctioned therapeutic cloning and the creation of IVF embryos for research when there is no acceptable alternative (creating a hierarchical order from existing *ethically created* cell lines, to surplus embryos, and finally creating embryos for research). In addition, unaltered biological material should not be subject to commerce. Importantly, to assess the necessity and alternatives for research, the establishment of a supervisory body was proposed.

For its originators, the SC Report is first and foremost a policy document that was produced to consider if there are serious ethical impediments in Singapore to stem cell research and cloning technology. It is also a consensus statement in that the recommendations proposed in the SC Report are essentially practical and regarded as generally acceptable in the context of the place and time (Lim 2006: 6; Elliott 2006: 73–75). In July 2002, then Deputy Prime Minister Dr. Tony Tan announced the government's acceptance of BAC's recommendations published in the SC Report (Tan 2002). Public feedback was recognised as a significant contribution to shaping science policies, and it is arguably representative of a more consultative approach to policy making.

2 Plurality in Singapore: Why Ask the Public?

A sceptical view concerning the nature of the BAC's consultative process may be that it amounted to nothing more than "public education" to generate support for a pre-approved policy. However, such a view is not supported by the fact that the meaning and scope of just and sustainable as key ethical principles underlying its deliberations were significantly influenced by the historical substance of important local institutions and by concerns taken up in the public interest. The consultation paper that preceded the SC Report presented an ethical assessment of hES cell research and cloning. It was an assessment that was made in a point of view that was locally situated. Neither the international ethical norms on the subject nor the

reasoned policy approaches (especially in the form of the 14-day limit to embryo research) proposed elsewhere would have had any immediate relevance to the public in general and many of the local institutions in particular. Stem cell science and cloning did not have a “public” in Singapore, and given its relatively esoteric nature, it was necessary to produce a public rationale (although not transcendental in a Habermasian sense), encompassing an ethical environment and language, for broader engagement. The consultation paper achieved this by proffering reasons for allowing hES cell research and SCNT, indications as to why the (interested, but especially the affected) public ought to be concerned about the subject and suggestions of (in the least, perceived) shared values that could be relevant in thinking through the issues. Rather than propounding substantive content, the consultation paper sought to create a deliberative space within which a number of possibilities could be explored.

In his study of a report of the US National Academy of Sciences relating to diet, nutrition and cancer, Stephen Hilgartner (2000) argues that various means of information control are entailed in the creation and management of a stage. Institutions and their work procedures regulate access to information much like a backstage that manages the flow of persons, speech and documents. More importantly, they serve to structure relations between experts and publics and are devices “of *constituting* performers and audiences with particular capabilities (and enforced inabilities) of speech and perception” (Hilgartner 2000: 147; emphasis in text). In a sense, the consultation paper may perhaps be likened to a stage upon which one narrative of stem cell science and technology is presented to a diversely composed audience which might not have had an immediate interest in the subject. In the context of our discussion, the BAC (and its institutional procedures relating to the consultative process and its documents) has been instrumental in constituting a public vis-à-vis stem cell science and technology.

It may be further argued that just as the enactment of a stage and performance would precede an audience, the BAC, through the instrumentality of the consultation paper, played a critical part in producing a “public” through active engagement with it. Perhaps implicit in all modes of communication, information restriction and management are necessary for coherence in the matter communicated. The communication then becomes a basis upon which other views become apparent, as is considered by Mairi Levitt (2003). Levitt discusses two models of public consultation on biomedical science and biotechnology. Consultation could be undertaken, as he writes, to enable researchers and policy makers to see what the public do not know and have concerns about and, subsequently, to plan public education that addresses deficiencies in ethical and scientific understanding and foster a public mandate for a planned policy. An alternative model is to uncover what the public do know and understand and to present the themes arising from the language in which they are presented and see what the relevant authorities can learn in order to gain a fuller and richer view of science and technology. Levitt endorses the latter model for in allowing the public a role in influencing development and regulation in biomedical science and technology, it does not divorce “science off its applications or divorce ethics from the world in which people are living and making ethical choices” (Levitt 2003: 24). The significance of public consultation is to facilitate an empirical moment in which assumptions about expertise are suspended

so as to “hear the diversity of voices” necessary to build consensus in policy making in any modern society (Levitt 2003: 24). Rather than regarding the two models as mutually distinct, the experience in Singapore was that whilst the consultation paper served to uncover the varied notions of “personhood”, it also highlighted epistemological deficiencies not only in public mentality but also among regulators and policy makers. This in turn contributed to an understanding that the ethical content to guide action in stem cell science and technology could not be directed within one particular knowledge system if a broad level of consensus is to be secured.

Donald Ainslie (2002) advances a similar point. Drawing on a Rawlsian analysis, Ainslie argues that the challenge of pluralism should not be addressed by a *modus vivendi* in which political arrangements and institutions are seen as authoritative only because, given the recognition of the substantively different and potentially irreconcilable commitments and values of individuals and groups, a compromise is seen as the only way to avoid civil strife. According to Ainslie, the politics and governance of such a society are inherently unstable since individuals and groups with their particular “comprehensive” doctrines—what frames their *everyday life* of making decisions, actions and meaning concerning embodiment, health and nature—would seek to renegotiate or recreate the social compromise when they gain sufficient political power. In other words, the natural consequence of such a solution to pluralism is an enduring contest for a single comprehensive doctrine as the only legitimate public discourse, given the promise of the expansion of options and advantages for one’s own everyday being. For Ainslie, stability occurs only when bioethical policy arises from a Rawlsian discourse of justice in which comprehensive doctrines are allowed to intersect in public consultations insofar as they leave their adherents willing to cooperate with those with whom they have moral disagreements. As he argues: “A just society must have an ‘overlapping consensus’ of such doctrines” (Ainslie 2002: 24). A political order established in this way, as Ainslie argues further, can even have the effect of revising the commitments and values of individuals and groups as they acknowledge the need to live with others in terms of settled accounts of what is just and fair to all within the polity. Amartya Sen (2009: 41–42), advances a similar point with the argument that the idea of justice incorporates some basic demands of impartiality that provides a sense of “objectivity” in that underlying issues are adequately scrutinised.

The consultation paper would at first be demonstrative of a particular (recursive) ethical form and language within which constructs such as “persons” and “embryos” could be understood. These constructs might not have had any immediate meaning for the “audience” subsisting within different and perhaps incommensurate comprehensive doctrines, but a suggestion as to the possibility of alternatives is created. Unlike a performance, this “audience” is not a passive monolithic receptacle to be inveigled. For, indeed, neither participation nor general consensus could be secured through compulsion. In providing feedback and through other means of engaging with policy makers, the “audience” took on roles as a varied cast of “actors” that presented different interests in, and point of views on, stem cell science and technology. As noted, these “actors” included religious and academic institutions, scientific, governmental and professional organisations, and patient groups. Here, we find the foundation of a civic epistemology being laid (Jasanoff

2005: 250).⁶ The ethical form and language that was deployed by the BAC—as we have considered—intended to demonstrate a moderate or gradualist style of ethical thinking in the matter of stem cell science and technology. The focus of the BAC was to enable broad participation, and this was achieved by drawing the “audience” out of its particular circumstances and knowledge systems. Emphasis on forming a moderate coalition basis of interaction is, as we have argued, implicit in the notion of “respect”, framed within the principled parameters of justice and sustainability. It was also the context upon which the artefact of an “embryo” acquired discursive content. Throughout the consultative process that led up to the publication of the SC Report, we find a “public” that is co-produced alongside a gradualist notion of an “embryo”, both of which are arguably shaped in response to information presented by the BAC and especially in its prioritisation of values or social goals. In putting forward a moderate gradualist approach in ethical analysis, there is an appearance of “public education”, although the intent has been to achieve a level of commonality that could facilitate participation and engagement.

For a public that has not been previously consulted on issues of biomedical concern, the work of the BAC reflects a civic epistemology-in-progress in that practices by which members of the public test and deploy knowledge claims used as a basis for making collective choices are being worked through and carried out within an institutionalised setting that is still emerging. These practices in turn reflect the ways in which the rationality and legitimacy of the claims of modern technoscientific cultures are assessed. Taken together, the BAC, its construct of an “embryo” and the “public” entailed, offers a “composite notion” comprising a mix of ways in which knowledge is presented, tested, verified and put to use in public arenas (Jasanoff 2005: 258). It is also in relation to the “public” that the social role of the BAC within the community is defined within a broader ethical form or epistemology of civic engagement.⁷ In light of this, one could consider the recommendations set out in the SC Report to be at least indicative of a developmental stage of the emergent civic epistemology.

3 Developments Since the Stem Cell Report

Subsequent developments from 2002 suggest a learning curve in ethics governance, not only for policy makers, but also for researchers, bioethicists and broader civil society interested in this subject. The *Human Cloning and Other Prohibited Practices Act* (Singapore 2005) was enacted and came into effect on 1st October 2004. It gives legal effect to two key recommendations of the SC Report: first, it prohibits reproductive cloning, and second, research on human embryos beyond

⁶ In turning to the concept of civic epistemology, Jasanoff emphasises the need to move away from a prior assumptions about what “publics” should know or understand of science. Instead, she argues for attention to be focussed on the ways in which knowledge comes to be perceived as reliable in political settings and how scientific claims are patterned as authoritative in any democracy, rather than to render normative judgement on the alienation of a “public” construed within some standard notion of democracy (see p. 250).

⁷ A means by which the BAC may be conceptualised in relation to its “public” is through the role that it plays in society under a Confucian paradigm (see Nuyen 2009).

14 days of growth is also prohibited. Apart from these, the legislation also precludes commercial trading in human embryos or gametes.

A relatively more far-reaching consequence of the SC Report, alongside other reports of the BAC, is that it establishes a framework for ethical governance of biomedical research in Singapore. Any research in Singapore that involves a human subject, human tissue (unless in small completely de-identified quantity or certain commercial cell lines) or personal information will need to undergo ethics review by an institutional review board (IRB) or a similar body prior to the commencement of the research. Ethics review ensures, among other things, that participation in research, whether as a research subject or through the contribution of biological material or information, presents minimal harm, is voluntary and on an informed basis.

Ethically sensitive research, such as therapeutic cloning and hES cell research that involves human embryos, is subject to legal regulation and additional scrutiny by the Singapore Ministry of Health (MOH). The *Directives for Private Healthcare Institutions Providing Assisted Reproductive Services (2006)* require all research on human embryos to be subject to prior written approval from the MOH. In addition, the explicit consent of the donor from whom the embryos were obtained must be taken, without inducement, undue influence or coercion, after comprehensive information has been provided to the donor. However, the regulatory purview of the *Directives* is limited to hospitals and clinics that fall within the jurisdiction of the MOH.⁸

The civic epistemology that is encapsulated in the SC Report provided sufficient clarity to constructs such as “embryos” for hES cell research and cloning technology to proceed on a regulated basis. However, it did not in itself contribute to a “gold rush” into these areas of research. The fact that certain jurisdictions in Asia, like Japan and Singapore, permit hES cell research and SCNT to be carried out did not result in a major influx of researchers, whether from within or without these countries. Margaret Sleeboom-Faulkner (2008: 94), indicates that strict and “rather un-transparent” regulation might have been a cause of the slow rate of the advance of Japanese hES cell research and SCNT compared to other areas of research like mouse genomics. The scandal relating to Professor Hwang Woo-Suk in December 2005 contributed to further conservatism on the part of Japanese regulators (for a discussion on related developments in South Korea, see Kim 2008a, b; Hong 2008; Leem and Park 2008). In Singapore, the BAC recognised that human eggs are a key resource for SCNT from the time the SC Report was prepared, but it would not be possible to address ethical concerns arising from the procurement of human eggs without first considering the more general concerns with research involving human subjects. In other words, the feasibility of regulation is in part dependent on the ethical content (as defined within the emergent civic epistemology) of the subjects of regulation. The publication of the BAC’s report *Research Involving Human Subjects: Guidelines for IRBs* in November 2004 was intended to bridge this epistemological “gap”. Since then, the pace of growth of civic epistemology has not

⁸ Noting this deficiency, the BAC has recommended in a recently published report for all procurement and use of human eggs for research to be subject to specific regulation. See Recommendation 1 of the ED Report.

slowed. In a recent public consultation conducted by the BAC to facilitate its deliberation on the procurement of eggs for research, we find an incremental buildup in the repertoire of ethical constructs that already comprised “embryos” (and by implication, “persons”) to include related notions of “eggs”, “compensation” and “inducement”. It is to this report we now turn.

As in the public consultation that culminated in the SC Report, a consultation paper on donation of human eggs for research was prepared by the BAC (and by its Human Embryo and Chimera Research Subcommittee in particular). On 7 November 2007, public consultation on egg donation commenced with a press conference. The consultation paper was sent to 94 research, governmental and healthcare institutions (including 21 fertility clinics) and professional and religious organisations for comment. Members of the public could download a copy of the consultation paper through the BAC’s web site, and feedback could also be provided through various means including email, an online discussion forum and an e-consultation platform (through a public outreach system called “REACH”). In addition, a public talk on the subject was held on 22 November 2007.

4 Public Consultation on the Procurement of Eggs for Research

Following the release of the BAC’s consultation paper on donation of human eggs for research, feedback from the discussion forum and e-consultation platform was provided by way of responses to questions set out in the context of a factual narrative.⁹ The narrative makes a strong association between the “public” and “common good” notions. In providing feedback, a respondent would be inclined to feel that a service was rendered as a citizen or perhaps as a member of an even broader community towards a common good. A notion of “common good” bordering on altruism is also implicit in the motives of the potential egg donors in the narrative. A contrast may perhaps be made with the situation in South Korea where nationalism was perceived to be a driving force behind egg donation for research—at least prior to the unravelling of the scandal around Professor Hwang (Kim 2008a: 408, 410–411). It was in this overall setting that respondents were presented with the three issues that related to the notions of “compensation”,¹⁰ “spare” eggs, “inducement”, “risk” and “safety”.

At the end of the consultation, 47 entries were made (on an anonymous basis) at the online discussion forum and the e-consultation platform, although at least 12 entries, and possibly up to 20, of which could have been made by a particular individual. This respondent appeared to be supportive of egg donation by women for research, but much concern was expressed over payment that could lead to financial inducement and exploitation. A number of proposals were made, including procedural safeguards against inducement. For instance, a cap was proposed by this

⁹ The narrative, as well as a summary of responses from REACH Online Discussion Forum and e-Consultation, is set out in the ED Report (at pp. D-1 to D-3).

¹⁰ In the consultation paper, “compensation” is defined as “recompense” for presumptive loss of income and/or risk and inconvenience”, whereas reimbursement relates to “repayment for incurred expenses”: ED Report at p. A-20, footnote (3). These definitions have been retained in the ED Report (at p. 19). See also discussion in Paragraph 4.26 of the ED Report (at p. 21).

respondent on financial compensation if provided, and this amount should be centrally regulated.

The general view was that women should be free to decide whether to donate eggs for research, although there was concern over possible health risks and inducement to donate for monetary gain.

As to the subject of compensation, there was general agreement to some compensation being provided to middle-aged donors as it was felt that these women should not be financially disadvantaged from contributing to the advancement of science, which was seen as a public good. As with the first issue, concerns were expressed over possible health risks and exploitation. In relation to the 21-year-old graduate student, the public was similarly of the view that compensation should be provided, although the risk of coercion and inducement was considered to be greater. This may be attributable to the Professor Hwang scandal in South Korea which received wide media coverage. There was no agreement over what donors should be compensated for, but many were in favour of compensation for time. In addition, many respondents were against commercialisation of the human body, although a small number voiced support for it.

On compensated egg sharing scheme (where a researcher could subsidise the IVF treatment of a woman who agreed to contribute some of her eggs or embryos for research), which was recently allowed in the UK (UK Human Fertilisation and Embryology Authority 2006), a majority of the respondents indicated that the cost of fertility treatment of a woman who donated her “spare” eggs for research should be subsidised, although some strongly rejected this and regarded such a scheme as effectively commercialisation.

Many of the concerns raised by the respondents are discussed in the consultation paper, with the exception of (a) privacy of donors and the confidentiality of their personal information, (b) the provision of proper information to donors and in a manner that is effective in facilitating understanding and (c) the availability of medical care for short-term and long-term adverse health consequences arising from the egg donation procedure. The third point was also raised in written responses from members of the public, including public institutions, to the key issues raised in the consultation paper. These key issues differed marginally from those presented in the online scenario.

On permissibility of donation, a majority of the respondents was in favour of allowing healthy women to donate eggs for research. Those who opposed were mostly motivated by religious concerns, although some (such as the Singapore Nursing Board) did not consider the benefit to outweigh the health risk entailed.

A majority of the respondents were also in favour of providing some compensation to egg donors because contributing to research was seen as advancing a public good and it would also be fair to donors. However, the importance of safeguards against overt commercialisation was repeatedly emphasised. Although the consultation paper listed “time”, “inconvenience” and “risk” as possible elements for compensation, there was no agreement on which of these or other elements that might be eligible for compensation. For instance, some respondents considered compensation for loss of earnings to be acceptable, whilst others regarded any form of payment beyond reimbursement to be commercialisation. Concerns were also raised as to whether payment could be properly audited. There seemed to be a

consensus that time could be compensated, although the same could not be said for risk.

To those who considered egg donation to be similar to participation in a clinical trial, compensation for risk should be provided. Others were concerned about inducement and proposed some form of insurance scheme to be implemented as compensation for risk. There was also some support for compensation for inconvenience, and one respondent proposed compensation for emotional and psychological harm. In addition, two respondents proposed incentives to be provided in order to encourage women to donate eggs for research. For instance, one respondent proposed a complimentary oocyte banking scheme to encourage career-minded women to donate unused eggs for research. Compensated egg sharing scheme was supported by four respondents, but opposed by at least one institution and one individual.

As for the sale of eggs, there was unanimity among respondents that commercialisation of any part of the body, including eggs, should be prohibited. Clear regulatory mechanisms were proposed for egg donation. Members of the legal community indicated that the current regulatory scope might be lacking in its reach and that it should encompass all biomedical research in Singapore. It was further proposed that egg donation be limited to Singaporeans and permanent residents in view of the significant socioeconomic gap between these classes of women and foreign workers. Other comments included a compensatory mechanism for adverse events, including some form of mandatory, no fault-based insurance coverage.

5 Report on the Donation of Human Eggs for Research

The ED Report was published by the BAC on 3 November 2008 following the completion of the 2-month public consultation that commenced on 7 November 2007. This initiative was undertaken by the BAC to revise and update the SC Report and is also part of its longer term intention to consolidate its views and recommendations in the area of hES cell research (Bioethics Advisory Committee 2007c). There was increasing pressure to find a sustainable source of oocytes for research, particularly for SCNT where the scarcity of human eggs is a major limiting factor. One solution is to use animal oocytes, which became the subject of another public consultation that was conducted by the BAC immediately following the closure of the consultation on egg donation (Bioethics Advisory Committee 2008a, b). The other possibility is to increase the numbers of oocytes retrieved from women by offering incentives to donate for research purposes. However, this would increase not only the risk of oocyte trading but also the possibility of inducing woman into a potentially risky procedure of hyperstimulation and oocyte collection with no direct therapeutic benefit. In the BAC's consultation paper on donation of human eggs for research, it was stated that a woman should be free to decide whether to make the donation 'regardless of her health status', but subject to meeting legal and ethical requirements (Bioethics Advisory Committee 2007b: A-12). In the ED Report, the same point was made by invoking the principle of respect for individuals, but with emphasis on the informed and voluntary nature of the giving and effective safeguards against exploitation. Procedural safeguards were given prominence, although the BAC recognised that they are not foolproof in that

vigilance on the part of the regulator is still necessary (Bioethics Advisory Committee 2008c: 15, 16).

The ED Report recommends that women donating eggs for research should be reimbursed for expenses incurred and compensated for loss of time and earnings as a result of the procedures required to obtain the eggs.¹¹ Compensation for inconvenience proposed in the consultation paper was not taken up in the ED Report, due perhaps to the arbitrary nature of the claim and difficulty in administration. Non-commercialisation of eggs was emphasised as this was regarded as necessary to avoid putting women at risk of exploitation and which is a goal that is consistent with the principle of safeguarding the welfare of all research participants.¹² Should an egg donor suffer from any medical complication as a direct and proximate result of the donation, she should be provided with prompt and full medical care. This provision gives effect to public feedback on the need to ensure that medical care is available for adverse health consequences arising from the egg donation procedure.¹³ Responsibility for this provision rests with the researchers and their institutions.¹⁴ The recommendation to allow limited compensation for healthy donors represents a departure from Section 13 of the *Human Cloning and Other Prohibited Practices Act* (Singapore 2005) which specifies that a person is prohibited from giving or receiving valuable consideration for the supply of human eggs or embryos, or to otherwise make an offer to that effect. Valuable consideration has been defined as including any inducement, discount or priority in the provision of a service to the person, but does not include the payment of reasonable expenses incurred by the person in connection with the supply. Reasonable expenses have in turn been defined to include expenses relating to the collection, storage or transport of the embryos.

In the ED Report, the BAC maintains that the ethical requirement for the donation of tissue (which includes embryos) for research to be outright gifts is not compromised so long as the contribution is not tainted by any inducement. The giving of eggs for research retains the character of altruistic gifting so long as compensation that is directed at ensuring the financial neutrality of the contributor does not amount to an inducement to make the contribution. In other words, the fair treatment of women who donate their eggs solely for research is the primary justification for allowing compensation to be provided for loss of time and earnings that are consequential to the donation. The BAC emphasises that a donor should not be made worse off by her altruistic giving, but it acknowledges the challenge of having to distinguish the provision of reasonable payment to donors from inducing women to provide eggs for monetary gain. Following this rationale, the BAC indicates that women should not be compensated for the donation of eggs for research when these are surplus to the treatment or obtained as a result of other medical treatments. As the risk, discomfort and lost time are already an inherent part of the treatment, no additional discomfort or inconvenience would have been assumed to donate these eggs for research. It was on this basis that the BAC did not consider the “compensated egg sharing” scheme adopted in the UK to be

¹¹ Recommendation 6 of the ED Report.

¹² See especially the discussion in paragraphs 4.16 to 4.21 of the ED Report, pp. 16, 17.

¹³ A general description of the healthcare system in Singapore is available at the web site of the Singapore Ministry of Health: <http://www.moh.gov.sg/mohcorp/hcssystem.aspx> (last visited 7 December 2009).

¹⁴ Recommendation 5 of the ED Report.

acceptable in Singapore (on the UK, see Capps and Campbell 2007). This might have also been the basis of the BAC's strict reading of "inducement" in that it does not agree with the proposition that not every inducement is undue (Emanuel et al. 2005: 336).

Perhaps a key issue in this ethical deliberation is whether eggs could be regarded as "spare" in the way that a tumour that has been surgically extricated could be so considered. If the issue had been decided in the negative, then there could be two implications. First, this would suggest that some form of payment ought to be made to women who contributed eggs for research because these eggs are not "spare" (and, by implication, unwanted) tissue from a medical procedure.¹⁵ Second, it further suggests that these donors ought to be treated no differently from participants in a clinical trial, and in respect of which, significant sums of money—to much ethical controversy—have been given to trial subjects. Indeed, this has been the conclusion that was reached by some.¹⁶ For instance, this position was adopted by the European Society on Human Reproduction and Embryology Task Force on Ethics and Law (2007), p. 1213, and it may have been a justification for some organisations to provide a relatively large sum of money to egg donors for research.¹⁷ The main difficulty with this position is that it brings to the fore the difficulty of distinguishing compensation from inducement, and any decision made in that connection may have serious repercussions on payments that are currently allowed for participation in clinical trials.

The ED Report makes clear that eggs could be "spare" in that they are surplus to the fertility treatment, and in such a scenario, the giving of eggs for research should not be on a compensated basis. Such a position is consistent with the BAC's view that any contribution of tissue for research should be by way of gifting made altruistically (Bioethics Advisory Committee 2002b), para. 8.6. This further avoids the ethical problems of inducement and commercialisation of the human body. However, the BAC recognises that in a situation where a healthy woman should decide to donate eggs for research, she should be compensated for loss of time and earnings from undergoing the egg retrieval process. As we have noted, the main justification for this stance is one of fairness—the donor should not be financially disadvantaged by the giving.¹⁸ Furthermore, the egg donation procedure is a very invasive one. Whilst the eggs that are given in this context are not "spare", healthy donors are not regarded as clinical trial subjects because the risks associated with the

¹⁵ Roberts and Throsby (2008) argue that 'fresh' eggs are never 'spare', and this could be a justification for the compensated egg sharing scheme which the UK Human Fertilisation and Embryology Authority has endorsed. The late Anne McLaren (2007) shared this position and thereby argued that scarcity of human eggs could be a basis for allowing human–animal combinations such as cytoplasmic hybrids to be created.

¹⁶ Ballantyne and De Lacey (2008) argue that if women are asked to provide eggs for commercial stem cell research, they should be fairly compensated for their contribution. Dickenson (2007), pp. 67–82, goes further in proposing some degree of property interest to be conferred as the protection of women's interests in oocyte donation by way of contract alone is considered to lack robustness.

¹⁷ Some of the organisations that allow compensation to be paid to donors of eggs for research have been considered by the BAC in its consultation paper: see pp. A-16 and A-17 of ED Report.

¹⁸ The BAC's broader conceptualisation of "payment" that should be made to healthy donors is arguably not too different from Charis Thompson's recommendation that "we compensate egg donors as a means of minimizing risks to donors, encouraging donations for the right reasons and under the best conditions of informed consent...and preventing trafficking in eggs" (Thompson 2007).

procedure are quantified (whereas there is greater uncertainty from participation in clinical trials)¹⁹ and researchers are required to insure these donors against any complications that occur as a “direct and proximate result” of the donation.²⁰ Whilst there may be a residual long-term risk that is as yet not quantified or is indeed unquantifiable, altruism requires that such a risk be borne by the donor who has not acted under any compulsion. It may be argued that rather than looking at particular risks, the BAC has instead focussed on addressing the safety of donors as a welfare concern. This construction of “risk”, “spare” eggs and “inducement” has in turn led to a particular set of procedures on consent taking.²¹

6 Discussion and Conclusion

In a paper that discusses Singapore’s initiative to promote the biomedical industry, Holden and Demeritt (2008) presented a critical view of the country’s “developmental state” political culture which stood in contradiction to a climate of liberal democracy within which the scientific enterprise is said to have thrived. Whilst observing that “good science” now also depends on being seen to observe certain ethical terms and conditions, they suggest that “the practice of ethical review was not driven by much consideration for the ethical concerns that the Singaporean people may have about biomedical research. Rather, it was largely about complying with international bureaucratic standards and procedures so that the resulting data could be used in drug licensing applications in the major markets of the US and Europe” (Holden and Demeritt 2008: 80). The existence of a “public” was explicitly called into question without considering efforts that have been made by the BAC to engage with the Singaporean public since 2001.²² The difficulty with this approach is that it presents a notion of “public” that is too static and essentialised and also quite contrary to the approaches in Science and Technology Studies (STS).

STS presents a citizen as possessing varied knowledge systems located in particular practices, subjectivities and identities. Such knowledge systems may be specialist ones, non-specialist or lay knowledge systems, or experience-based expertise. Whilst it is recognised that different forms of expertise are not readily combined, scientific knowledge is regarded as effectively cultural in that it “embodies, reflects and projects commitments of a human kind, which also shape human relations and identifies, imagined communities and ontologies” (Leach et al.

¹⁹ The US National Research Council and Institute of Medicine (2007) suggest that medical risks of human egg donation are quantifiable and manageable. This view is not shared by others who argue that there is residual risk that could be unquantifiable and significant (see, for example, Dickenson and Idiakez 2008). It should also be noted that some members of the public indicated in their feedback that compensation for risks would not be adequate.

²⁰ The words “direct and proximate” mirror those in Section 100095(c) of *The CIRM Medical and Ethical Standards Regulations* of the California Institute of Regenerative Medicine (2007).

²¹ A relatively comprehensive discussion was taken up in the ED Report that culminated in Recommendations 2 to 4; see pp. 12 to 15 of the ED Report.

²² Holden and Demeritt state: “In a developmental state vaunted for its ability to mould its citizenry to adapt to industry’s shifting labour force requirements, it is not at all clear what these liberal ideas about public engagement and opening up science might mean, since there is no public as such to engage and thereby democratise science” (2008: 83).

2005: 12–13). In other words, scientific knowledge is largely inseparable from local conditions (such as religion) and questions of social order and prevailing relations of authority. Scientific engagement makes citizens, much in the way that knowledge and its authority arise through particular practices and in the context of specific network of actors and objects that they involve. The means by which engagement is achieved is complex, but citizenship is associated with those who are able to participate and who do practise engagement. Practising citizenship is regarded in turn as a learning process (Leach et al. 2005: 30–31).

Limited accessibility here provides an occasion for criticism, but it is questionable if there is any deliberative forum that is not defined within a framework that silences other perspectives or agenda (Leach et al. 2005: 30). It has been suggested that science itself—in its process of vindication through experimentation—creates a “public space with restricted access” in that the practice of witnessing (in the early days of modern science) was limited to particular communities of people such as clerics and lawyers (Shapin and Schaffer 1985: 336). Issues that are raised as a matter of public concern implicate certain actors jointly and antagonistically (Marres 2007: 772–773). There are not many issues that could be framed in such a manner as to be of practical relevance to every member of a society. Neither would it be sensible to consider a society to be “democratic” only if its members could (and would be willing) to vote on every sort of issue that may have some implication on them. Furthermore, globalisation has contributed to greater diversity in the framers of issues that relate to stem cell science and technology.

When the BAC undertook the task of considering the ethical, legal and social implications of stem cell science and technology, there already was active debate on the subject in the global forum. The very premises defined in the ethical, legal and social are those widely employed in the industrialised West and in a number of countries in East Asia. Like genetics, stem cells became what Sarah Franklin considers to be a “global biological”, replete with imagery of technological potency, human frailty and future salvation (Franklin 2006: 61). The situation for human eggs in the more recent work of the BAC was no different. Hence, the BAC would not have had a free hand in framing the issues for public consultation on either subject. At a broad level, there appears to be a growing alignment of scientific issues that does not require orchestration by any institution—local or international. In the ED Report, a table of regulatory approaches of select countries is illustrative of this.²³ A further example is that the danger posed to impecunious women, especially those in poor developing countries, was recognised and articulated by both the BAC and by members of the public alike. Interestingly, this did not mean that the policies made in relation to the issues would necessarily converge. As we have noted, the BAC did not consider the “compensated egg sharing” scheme to be ethically acceptable in Singapore, even though a limited form of compensation is allowed for healthy donors of eggs for research.

Given the myriad of interests, meanings, hopes and concerns—both global and local—that constitute stem cell science and technology, public accessibility has presented significant practical challenges to policy and bioethical bodies like the BAC. Whereas the outreach of the BAC has been broad, the responses elicited appear to comprise a consistent group of core institutions. There could be a few

²³ ED Report at pp. 18–19.

reasons for this. First, many of the social roles that were performed by civic organisations have been progressively subsumed within the various instruments and organs of the state (Ho 2009). Second, individual members of society—even highly qualified ones—consider their personal views to be of insignificant weight and would prefer to speak on behalf of, or otherwise as part of, a group or institution.²⁴ Third, the deliberative “space” that is created in the consultation papers give emphasis to a notion of citizens as socially embedded and membership within a community. This element is arguably present even in the more generic REACH online consultative platform. Hajer’s observation (2009: 185) on the performative aspect of decision making in rebuilding Ground Zero is pertinent: “It is the very stagedness here that creates the power of the deliberative moments: by virtue of being staged they have generated a moment in the public consciousness.” Fourth, the state is generally perceived by members of the public as coherent and rational, even if restrictive on issues that are regarded as politically sensitive.²⁵ But as Stephen Hilgartner (2000: 149–150), notes, champions of transparency sometimes romanticise openness without adequately considering the merits of institutional procedures or fully recognising the ubiquity and inevitability of information control. He persuasively argues that the fundamental choice is not between the transparent or the opaque, but different systems that shape the role of experts and audience and different ways in which science is presented on the public stage. Sheila Jasanoff advances a similar point, in her indication that “America’s particular democratic settlement, in which public claims are continually tested by skeptical citizens and journalists...the very idea of public demonstrations as a space of experiment is culturally particular, not universal, way of engaging citizens. It assumes that disclosure and transparency are *possible*, and that people have the will, the means, and the competence to evaluate the claims and proofs presented to them” (2005: 263; emphasis in text). In East Asia, it has been noted that STS scholars have begun reflecting on the limitations of a deliberative model of public participation that they have enthusiastically promoted (Chen and Wu 2007: 18). Commenting on three papers that address citizen participation in relatively disparate areas of science and technology, Brian Wynne’s observation of the inadequacies of conventional visions and practices of public participation is instructive: “Not only is it *not* a matter of claiming that publics know as well as experts in their specialist field; we should also not operate in the belief that citizens have well-articulated imaginations about what they believe to be desirable or possible in domains such as health, energy, agriculture and food. Thus to expect such inputs as a currency of participation processes is optimistic, even if searching and salient questions will be posed of experts posing their own such imaginations” (2007: 106–107; emphasis in text). In light of these arguments, Massimiano Bucchi and Federico Neresini (2008: 461–464), provide an instructive overview by mapping the different forms of public participation given varying degrees of spontaneity and intensity of participation in the process of knowledge construction. They insightfully observe (2008: 466): “If the “anaesthetization” of politics by the massive injection of technoscientific expertise has not been sufficient to deal with crucial dilemmas, this is

²⁴ This observation is drawn from the ethnographic study of Ho, W.-C. (one of the contributors to this paper) conducted in Singapore from October 2007 to October 2008.

²⁵ Ibid.

not a reason to expect that those same dilemmas will be solved simply by injecting democratic arrangements into science, especially if democracy is defined with its most simplistic meaning of “majority voting”.

The “public” that has emerged from the SC Report and the ED Report share certain features with Annelise Riles’ PAWORNET. In her study, Riles (2001: 58–59, 68), observes that networkers did not understand themselves to share a set of values, interests or culture. Instead, they understood themselves to be sharing in their involvement in a certain network that was a form of institutionalised association devoted to information sharing. What defined networkers most of all was the fact that they were personally and institutionally connected or knowledgeable about the world of Pacific institutions and networks. In particular, it was the work of creating documents, organising conferences or producing funding proposals that generated a set of personal relations that drew people together and also created divisions of its own. The “public” of the SC Report and the ED Report comprised institutions and a number of individuals—often institutionally connected—that represented a diverse set of values, interests and perhaps culture (construed in terms of their day-to-day practices in the least). This resembles a network in a number of ways. They were brought into a particular set of relationship within a deliberative space created in the main by the consultation papers and reinforced through a variety of means that included public meetings, conferences and feedback sessions. Arguably, even individual feedback from REACH encompasses a certain kind of pre-existing (sub-)network that has been formed with a view to soliciting relatively more “spontaneous and independent, uninvited forms of civil participatory action” (Wynne 2007: 107). But this “network” is not a static one. It varies with, but also shapes, the broader phenomenon of science and expectations as to how science ought to be engaged. In this connection, Riles’ observation is instructive: “It is not that networks “reflect” a form of society, therefore, nor that society creates its artifacts.... Rather, it is all within the recursivity of a form that literally speaks about itself” (2001: 69). To better appreciate science and its “public” (that is, citizens who engage with it), one should also appreciate the attending (and emergent) civic epistemology.

The BAC was not established primarily to engage the public; public involvement was subsequently seen to be vital for reasons that include the filling of epistemological “gaps” in institutional knowledge and to secure broader legitimacy on an initiative that will not yield immediate benefit to the public. In this paper, we have attempted to explicate the “public” of stem cell science and technology in Singapore by examining some of the key documents that were produced by the BAC and a civic epistemology that has taken shape since 2001. We have broadly considered how this deliberative space was initially developed as a moderate gradualist platform that was grounded in certain values regarded by the BAC as critical to facilitate participation. This initiative contributed to the formation of a “public” in that a set of social relations emerged in the way that the BAC interacted with a diverse constituency of respondents. Ethical constructs (like “embryo” and “egg”) and language (centred around a notion of “respect for persons”) became essential components of a recursive form of an emergent civic epistemology or a generally accepted or recognised basis by which the “public” would think about and engage stem cell science and technology. More recently, several events leading up

the BAC's recommendations for egg donation contributed to the development, as well as refinement, of ethical constructs and language. A "learning curve" was also evident in that a number of respondents, especially those from religious groups, felt that they were better able to engage in ethical deliberation outside of their particular belief systems. As noted earlier, a number of respondents to the consultation on egg donation voiced the need to explicitly provide for privacy safeguards. The BAC might have considered an explicit mention to be unnecessary as the concern would have been addressed in an earlier report (2007a, b, c),²⁶ although its mention and subsequent incorporation into the ED Report reflect learning and application of ethical goals and language.²⁷

As this paper is a preliminary attempt at elucidating a "public" and civic epistemology that has emerged since 2001, there are still many deficiencies in the research. It is envisaged that further research is necessary to better understand the ways in which the various ethical constructs and language have emerged, as well as their political, social and cultural impact. The ways in which social relations have been created and altered have also not been fully explored here. We were unable to delve into the various selective mechanisms that were entailed in constituting the "public", and further study into institutional procedures and social structures will be necessary. However, it is hoped that this paper will encourage further research into the "public" as a problematic and also into the emergent civic epistemology, which is arguably a recursive form.

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²⁶ Ibid.

²⁷ Paragraph 4.6 of the ED Report addresses the need for privacy that was raised by a number of respondents during the public consultation.

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