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The matrix of stem cell research: an approach to rethinking science in society

edited by C. Hauskeller, A. Manzeschke, and A. Pichl, Abingdon, Routledge, 2020, 213 pp., £36.99 (pbk), ISBN 13: 978-0-367-72683-6

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BOOK REVIEW

The matrix of stem cell research: an approach to rethinking science in society, edited by C. Hauskeller, A. Manzeschke, and A. Pichl, Abingdon, Routledge, 2020, 213 pp., £36.99 (pbk), ISBN 13: 978-0-367-72683-6

How can, and should, the phenomenon of “stem cell research” be understood? That is the big question underpinning this book. The answer proposed by editors Christine Hauskeller, Arne Manzeschke and Anna Pichl, lies in the titular “matrix” of stem cell research. The matrix they present in the book’s opening chapter, on which they are also authors, is less a method or tool and more an injunction to consider the technical and conceptual aspects of stem cell research in tandem with, and as co-constituted by, the social, political, economic, institutional, and moral dimensions. That goal is unlikely to be especially objectionable, or novel, to STS scholars, and in many ways the book, and the matrix concept, is envisioned more as a counterpoint to conventional, teleological narratives of science presented in life science articles, textbooks, and popular media articles. Historians of science are also enjoined to move beyond a focus on specific objects or research groups to consider the broader social and political currents shaping science (echoing the approach advocated by Hannah Landecker [2007] with regards to cell technologies), while philosophers and bioethicists are reminded of the need to pay close attention to the value commitments involved when deciding which accounts and elements of scientific developments to present as unproblematic givens and which to problematize. So how well does it work?

The book itself is an edited collection, with chapters from a variety of disciplinary perspectives each addressing a different facet of stem cell research. Some chapters tread familiar ground for STS scholars; Claire Tanner and colleagues revisit themes from their previous work on stem cell tourism (Petersen *et al.* 2017; Petersen, Seear, and Munsie 2014), while Lorenzo Beltrame’s overview of the bioeconomy as a concept provides a useful companion to recent work by Mittra and Zoukas (2021). The strongest of these contributions is Melpomeni Antonakaki’s detailed examination of the way(s) in which logics of audit and experiment are integrated in formal investigations of research misconduct. Drawing on the “STAP” case in which several members of a research team at the RIKEN Centre for Developmental Biology in Japan were accused of falsifying

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data and results in a paper claiming a novel method of producing stem cells, this chapter usefully extends our understanding of scientific controversies.

The remainder of the book's twelve chapters ranges further afield, with contributions from law, ethics, philosophy of science, and most unusually for this type of collection, three chapters from life scientists. Stephanie Sontag and Martin Zenke provide an overview of contemporary natural sciences research on stem cells, focusing on induced pluripotent stem cells (iPSC), which are produced by "reprogramming" ordinary cells of the adult body, such as skin or hair cells, back to a "pluripotent" state. This means that, like the cells of an early embryo, they have the capacity to generate lineages of any cell in the body; eye, liver, heart, etc. Maryam Ghasemi-Kasman introduces readers to the novel domain of *in vivo* cellular "reprogramming," which attempts to bypass the need for pluripotency itself by use advanced bio-chemical techniques to transform cells directly from one lineage or type to another. The third life sciences chapter from Iryna Prots, Beate Winner and Jürgen Winkler summarizes current efforts to use iPSC as tools to create models for neurodegenerative diseases in the laboratory (see e.g. Milne 2016 for a critical account).

By contrast, the respective legal and bioethical chapters deal with issues related to human embryonic stem cell (hESC) research. This is less credence for the old saw about "science racing ahead while law and morality struggle to keep up" and more a recognition that humanities and social sciences scholars typically have greater scope to scrutinize the status quo and (re)examine the legitimacy and reasoning behind extant decisions and established practices than their colleagues in the life sciences. The chapter from Fruzsina Molnár-Gábor examines the roles of "opening clauses" in European patent law; terms such as "ordre public" and "accepted principles of morality," that connect formal legal text to extra-legal ethico-political endeavors to limit patentability of controversial aspects of biotechnology, and the role of case law in interpreting and implementing such clauses. Ahmet Karakaya contributes to the plurality of accounts of "the" embryo question by looking at how Muslim scholars in Turkey dealt with the morality of deriving and using stem cells from human embryos for scientific research. The remaining two chapters, from Melinda Bonnie Fagan and co-editor Anja Pichl, bring the lens of philosophy of science to bear on the very idea of "the stem cell" as a coherent, bounded entity. Where Fagan's chapter examines the assumptions and experimental conditions underpinning the stem cell concept, Pichl accounts for the persistence of the idea of "the stem cell" as a discrete entity in both scientific and popular discourse. Both chapters have something to offer and make for interesting comparison with STS concepts such as "bio-objects," which also emphasize the ongoing work needed to stabilize entities such as (stem) cell lines as coherent objects of science and commerce (Vermeulen, Tamminen, and Webster 2012).

Each of these chapters is competently written and makes a worthwhile contribution to knowledge on its own disciplinary terms. The variety of disciplinary

perspectives on show certainly demonstrates the “multipleness” (cf. Mol 2003) as “stem cell research” as a subject is brought into focus through the distinct prisms of law, ethics, STS, anthropology, philosophy, and biology (although it is worth noting the absence of perspectives from history of science, or a laboratory ethnography of the kind conducted by Suzuki [2014] or Meskus [2018]). However, the idea of the “matrix” as set out in the opening chapter aspires to more than this. Given their intellectual commitments we would not expect the editors and authors to propose a grand, totalizing narrative of “stem cell research,” but the “matrix” does aver a more complex and nuanced way of conceptualizing “stem cell research”; the “rethinking of science in society” signaled in the book’s subtitle. Ultimately, the task of drawing out this approach is largely left to the reader through a comparative reading of the different perspectives set out in each chapter. Most of the chapters (except the two philosophy of science chapters) do not discuss or reference other material in the book. In the book’s closing chapter, Achim Rosemann reflects on how the experiences of regulating stem cell research can inform the emerging discussion of how the global governance of gene drive technology can and should be constituted, but nowhere in the book is there an attempt to sketch out the kind of inclusive, multi-dimensional account of stem cell science that the authors advocate. In this regard the book promises more than it can deliver. Nonetheless individual chapters are likely to be of interest to STS scholars. The collection also has potential to be used in the classroom as a way of demonstrating to students how a particular topic in science can be framed and studied in sometimes radically different ways by different disciplines.

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