**The New Biologies: Epigenetics, the Microbiome and Immunities**

**Editorial**

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This issue is made up of a special collection of articles that have been submitted to the journal, which tackle issues that have primarily been the subject and object of the life and biological sciences; this includes pregnancy, obesity, antibiotic resistance, and immunity within the context of viruses and super-bugs. All of these issues in different ways have increasingly become the subject of theories and methods within the humanities and social sciences. This includes approaches, which work across disciplines and intellectual traditions, in order to open up the complexity of what might count as an object of knowledge within these different contexts. Each paper in this special collection is engaged in productive approaches that cut across disciplines and that enable dialogues and exchanges to take place between the social sciences, life sciences and philosophy. The articles respond to some of the new developments across the life and biological sciences, which include the field of epigenetics, the genome and microbiome and new theorisations of immunity. They engage in different ways with emergent issues, problematics, ontologies, controversies and debates within these fields. These are explored at the intersection of science and technology studies (Landecker), new materialism (Jamieson; Warins et al; Yoshizawa); and critical theorizations of immunity, which draw primarily from cultural studies of immunity, including the writings of Ed Cohen (2009), Robert Esposito (2013) and Margrit Shildrick (2010, 2015) (see Davies et al; Newman et al).

The articles when read together identify some of the points of contact and interfaces, across disciplinary boundaries and traditions, which signal or gesture towards new agendas for exploration. They help identify what some of the points of contact might be, whilst at the same time exploring some of the tensions, contradictions and potential issues that arise in the identification of any “new agenda”, whether that is “new materialisms” or even the use of the term “new biologies”. The articles are brought together in this special collection to open up an agenda for exploration that highlights the importance of making links with existing work that has attempted to explore the co-constitution, co-evolution and co-implication of biological or vital processes within processes and practices that are simultaneously technical, cultural, symbolic, material, economic and immaterial. This might include traditions of writing influenced by the concepts of biovalue and biocapital (Rajan, 2006; Cooper, 2008), or the concept of local biologies (see Lock, 1993), or the concept of “socialized biology”, which we find in the early writings of Denise Riley (1983), for example. These traditions of writing on materiality and biology counter some of the assumptions of vitality, flow and indeterminacy, which can be found in more speculative philosophical perspectives.

Some of the connection with existing traditions of work on the body and embodiment are staged within the articles, including a reinvigoration of Bourdieu’s concept of habitus, or Deleuze’s concept of the fold, when read through debates within the field of epigenetics (Warin et al). However, at the same time there is a recognition of some of the limits and scope of such aims to integrate the social sciences or humanities with emergent fields across the life and biological sciences. This issue demonstrates that we are at an exploratory stage and that any genuine integration of the humanities or social sciences by the sciences will require engaging scientists in some of these discussions.

So as well as the search for new terminology and theoretical apparatus, we need to be mindful of the sociology and politics of knowledge, which shape interchange and what becomes identified as potential areas for rapprochement between the sciences and humanities. As a set the articles begin to demonstrate some of the interstices, gaps, tensions, puzzles, anomalies, agreements and disagreements, which shape any claim on concepts or explanatory structures being “new”, or the issues which shape the need for innovative propositions and methodological innovation.

The field of body studies is a fertile ground for engaging in such debate and discussion given its transdisciplinary reach and traction. The commitment to challenging, extending and developing what counts as a body and launching, supporting and extending new directions is characteristic of the field. This is signalled by the diverse interests and approaches brought by readers and contributors to the journal. Since the journal was inaugurated in 1995 we have published a wide range of different theories of the body and embodiment. Many of these have produced noteworthy interventions into the field and into very many different fields, including anthropology, the medical humanities, sociology, cultural theory to name just some areas.

The field of body studies is also a transdisciplinary field that is situated, responds to and emerges from specific sites, contexts and surfaces of emergence. From “sociology of the body” as a distinct sub-discipline of sociology, this has grown within the contemporary sociological imagination to an increasing rapprochement between sociology and the life, biological and neurosciences. There is now a renewed attention to the body, or perhaps “brain-body-world entanglements”, and how best to analyse ‘life” and vital processes (see Rose and Abi-Rached, 2013, for example). This trend is captured through terms such as the “biosocial”, “biocultural”, “political biology”, and so forth (see Frost, 2016; Meloni, 2016), which are taken to signal something new about the current conjuncture and the opportunities for sociologists and others to become more open to the biological and life sciences sciences (see Meloni, Williams and Martin, 2016, for example). As Maurizio Meloni (2014) has argued the current conjuncture is re-shaping sociological inquiry as potentially one which is 'becoming more open to biological suggestions, (just) at a time when biology is becoming more social (page, 594).

This statement or provocation is particularly grounded within some of the new developments across the life and biological sciences, which include the field of epigenetics, the genome and microbiome, new theorisations of immunity, as well as the rise of the social neurosciences, which situate brainhood within specific contexts of production and reception. The interest in the potentiality of epigenetics, the microbiome and studies of immunity within the context of pandemics and related events, including the urgent problem of antibiotic resistance, all mark the articles brought together in this special collection. The contributors in different ways all take on the challenges of working across any assumed ontological or epistemological differences between the sciences and humanities to open up some of the possibilities proffered by what are often termed “*The New Biologies*”. This includes accounts of social or political processes that now draw breathe from the sciences in order to animate and extend how power works and operates, for example[[1]](#endnote-1).

The term “New Biologies” is being used by some scholars to refer to scientific fields of discovery and innovation that have the potential to open to more sociological forms of inquiry (see Meloni et al, 2016). At the same time it is important to recognise the genealogy of this term, which was first used in a set of policy documents by the American government signalling the potential of the life sciences to help shape resolutions to some of the urgent problems facing humankind within the context of what has come to be known as the anthropocene (see Mackenzie, 2014; Zylinska, 2015). “New Biologies” specifically relates to the use, shaping and development of a new biology integrated with physics, chemistry and computation to address complex challenges in food, energy, environment, health and what are constituted as other “social” issues[[2]](#endnote-2). The identification of body studies or approaches to the body and embodiment developed within anthropology, sociology, cultural studies and related disciplines is not identified within this context as taking on an importance in shaping some of the parameters or contours of such a “new biology”.

At the same time the interest in these areas by non-scientists in the humanities and social sciences is often marked by a promissory hope, and the desire to break down entrenched and historic antagonisms between the sciences and humanities disciplines. The aim is often to engage in a shared and collaborative project to explore the contiguous processes and practices (symbolic, technical, biological, historical, material, immaterial, psychological), which characterise the emergence of the human as a processual, indeterminate entity. Such “biosocial” projects are also often driven by a desire to find new concepts in the sciences to furnish accounts of already-established theoretical traditions, such as finding a scientific underpinning for Bourdieu’s concept of habitus within the contemporary field of epigenetics to address the “obesity epidemic”, for example (see Warin et al, this issue).

This move towards the sciences as potential allies aims to expand already established sociological concepts, as at the same time developing and extending epigenetic arguments[[3]](#endnote-3). This particular trend might be described as an “ebullient” space of interdisciplinary engagement. Callard and Fitzgerald (2015) use the term “ebullience” to describe a mode of engagement within the context of the neurosciences, which tends towards an acceptance or assumption by humanities and social scientists of ‘experimental results and theoretical statements from the neurosciences as more-or-less true – with little contest or context, and in the absence of a sense of the wider, often fierce, epistemological and ontological debates within those sciences’ (p. 11).

This trend that is laden with the danger of “cherry-picking” specific authors or theories from particular fields such as epigenetics signals some of the issues that surround any engagement of science by non-scientists. One of the key debates identifies the need for more engagement with the field of contestation, argumentation, controversy and legitimation, which surrounds any scientific field (also see Papoulias and Callard, 2010). However, the kinds of scientific *inter-literacy* needed to be able to read, interpret, decipher and contextualise scientific theories is not an easy task to acquire. This means that mischaracterisations of science and a lack of attention to the heterogeneity of fields of debate remains an important issue (see Franklin, 2014).

As we previously explored in our *Affect* special issue (Blackman and Venn, 2010), one contemporary trend across the humanities and social sciences is to explore and identify some of the common ontologies emerging across the sciences and humanities, which emphasise the complex, processual, indeterminate, contingent, non-linear, relational nature of phenomena constantly open to effects from contiguous processes. These arguments are being advanced in relation to the fields of genetics and the biological sciences (including epigenetics and the microbiome), mathematics, quantum physics and the physics of small particles, the neurosciences (particularly the social and critical neurosciences), affect theories across media and cultural theory (see Gregg and Seigworth, 2010), new materialisms (Coole and Frost, 2010), as well as the neurosciences of affect and emotion (see Wetherell, 2012).

These common ontologies are grounded in concepts such as biosocialities (Rabinow, 1996), naturecultures (Haraway, 2003), entanglement (Barad, 2007), assemblage, flow, turbulence, emergence, becoming, relationality, intra-action, co-evolution, co-emergence, the machinic, to name just some of the heuristics and new biosocial languages being deployed. In their wake, relationships between the social and the natural, the mind and body, the cognitive and the affective, the human and the technical and biology and identity are being reformed (see Blackman and Venn, 2010: 7).

The assumption of emergent shared ontologies across the sciences, humanities and social sciences connects with a trend towards process, indeterminacy and relationality across other fields, including the field of affect studies, new materialism, feminist, queer and trans studies, critical race studies and so forth. This includes a breaking down of the distinction between human and other life forms, between binary genders, between past and present, self and other, material and immaterial, and many other dichotomous forms of thought and practice. At the same time any apparent newness of the present conjuncture needs to be located and related to longer histories of work on the body and embodiment, which have helped shaped the conditions under which new directions emerge. These sadly are sometimes not acknowledged or even in some cases erased from the histories of scientific innovation.

 This erasure has long been a concern of feminist scientists and academics whose defining concepts become part of the pre and contemporary history of emergent debates, but are often left out, occluded, forgotten or overlooked. As an example of this, in February 2015, *Nature*, the “international weekly journal of science”, ran an article entitled Sex Redefined in which Claire Ainsworth (2015), a “freelance writer based in New Hampshire, UK”, reported that “the idea of two sexes is simplistic”, and that “biologists now think there is a wider spectrum than that”. Recent scientific discoveries, it is argued, “do not sit well in a world in which sex is still defined in binary terms” (ibid)
[http://www.nature.com/news/sex-redefined-1.16943](http://www.nature.com/news/sex-redefined-1.16943%22%20%5Ct%20%22_blank). While these discoveries were welcomed by LGBTQI activists and academics exception was taken to their alleged newness. In the subsequent issue in March 2015, *Nature* published a response by Anne Fausto-Sterling, a professor of Biology and Gender Studies at Brown University, who has written extensively on the biology of sex and gender, most famously in the controversial essay ‘The Five Sexes’ (1993). Fausto-Sterling, whose work goes unmentioned in the original article, argues that the “concept of multiple sexes is not new”, but rather that it emerged in the early 1990s when feminist critics of science joined forces with intersex activist movements.

Mainstream biology is finally responding to longstanding calls for a pluralfication of genders and sexes from within intersex activism, feminism and feminist STS, Fausto-Sterling argues. Science is not isolated from society, she points out, suggesting that scientific discoveries do not occur in a vat. Rather, “ideas travel into the lab from street activists, literature and varied scholarship, and move back out again. As a result of their efforts, research scientists were pushed into visualizing the previously invisible.” (Fausto-Sterling, 2015) [http://www.nature.com/nature/journal/v519/n7543/full/519291e.html](http://www.nature.com/nature/journal/v519/n7543/full/519291e.html%22%20%5Ct%20%22_blank)

This example shows how complicated any engagement is and how important it is to carefully attend to prior histories and traditions of writing that might be inadvertently excluded from citational politics and histories of disciplinary engagement and practices of remembering and forgetting.

This special collection appears at a time when we are seeing a range of special issues and collections addressing the potential and significance of the life and biological sciences for the social sciences and humanities. This includes a special issue of *The Sociological Review Monograph* titled, “*Biosocial Matters: Rethinking Sociology-Biology Relations in the Twenty-First Century”* (see Meloni, Williams and Martin, 2016). It was noteworthy however that there was very little acknowledgement or engagement with the broader field of body studies, or awareness of the variety and range of approaches to the body and embodiment that have been published within the field. This is particularly pertinent given Margaret Locks (2013) recent interventions in relation to the apparent hope and promise of epigenetics (also see Blackman, 2016). She argues that a key concern is the molecularized versions of the body and embodiment enacted within epigenetics, reflected in how “environment” or the “cultural” is being understood, conceptualized and acted upon. As an anthropologist of the body and important body studies scholar Lock cogently draws attention to just how important the field of body studies is within this context.

This is also marked in some of the contemporary work, which claims a newness for approaches such as new materialisms, for example (see Jamieson; Yoshizawa, this issue), whilst at the same time being in danger of occluding the long and rich histories of work on the body and embodiment that characterise the field of body studies. New Materialisms has been described by Coole and Frost (2010) as a concern with the nature of matter and the place of embodied humans within a material world. Although the authors are very clear to stress that the *new* in New Materialisms should not be divorced from its rich materialist heritage this is often displaced in some of the engagements, which are gathered together under the designation of new materialisms. This is often a source of contention by reviewers of articles submitted to the journal whose remarks are revealed to authors as part of processes of review and revision. This tension is however a productive tension and one that we hope will open up further debate and discussion. We certainly invite further contributions from established body theorists and those entering the field of body studies via new materialism, the “new biologies”, and those concerned with refiguring the biosocial and biocultural in light of new scientific developments.

An example of a new materialist approach being brought into dialogue with an established body theorist comes from one of the contributors to this special collection. Michelle Jamieson’s article titled “The Politics of Immunity: Reading Ed Cohen through Canguilhelm and New Materialism”, reads Ed Cohen’s seminal book, *A Body Worth Defending: Immunity, Biopolitics and the Apotheosis of the Modern Body* (2009, Duke University Press) through the lens of new materialism. Materialist accounts of matter-meaning and the entanglement of politics and biology are proffered as the solution to what is rendered as Cohen’s overly discursive account of immunity. For many readers this might be read as a mischaracterisation of Cohen’s project, which aims to explore how conceptions of immunity (such as immunity-as-defence) are entangled and emerge within specific milieu, such that any scientific concept is never purified or divorced from its context. One of the tensions in any emerging debate within body studies vis-à-vis science however is how to explore the status of scientific concepts to what in the past has been described as the problem of the materiality of bodies.

However, this debate is far from new and takes us back to feminist concerns with the body and how biological or vital potentialities are thoroughly co-implicated, co-enacted and co-evolve with the political, cultural, historical, symbolic and so forth. The tensions might be newly configured within the present but there are historical precedents, which situate the parameters of contemporary debates within, often unacknowledged, conditions of possibility and emergence. However, this paper raises a pertinent question about the relationship between vital processes, the empirical data produced within and across the biological and life sciences, and theories of the body and embodiment within the field of body studies.

Elizabeth Wilson’s (2015) recent book *Gut Feminism* ‘begins with the conjecture that despite the burgeoning work in feminist science studies there is still something about biology that remains troublesome for feminist theory’ (p. 3). She goes on to argue that although there has been considerable advances in understandings of the body and embodiment across feminism and body studies for at least the last three decades there is often ‘reluctance to engage directly with biological data’ (ibid). By biological data Wilson means the kinds of empirical data produced within specific experiments, which underpin particular claims made across the sciences in ‘genetics, neurophysiology, evolutionary biology, pharmacology, or biochemistry’ (ibid). The critical question is how to account for what Wilson has also termed more biologically attuned accounts of the body. This debate I am sure will rage on and increasingly will be done with more nuance and attention to biological data and how to account for its value, efficacy and ontological status.

We hope that this special collection begins to draw out the possibilities, tensions and issues that have been identified. We start with the contribution of Hannah Landecker and her article, “Antibiotic Resistance and the Biology of History”. Landecker primarily explores the social and historical context of biotechnologies and the life sciences and has a specific interest in microbiology, epigenetics, the microbiome and cellular life forms. Her article is situated within current concerns about the global problem of antibiotic resistance and argues for an understanding of the materiality of history as well as the historicity of matter. Like Cohen, Landecker’s writing skilfully uses historical archives and puts them to work by re-moving or putting them back into circulation in the present. As she cogently shows the historical records, which trace the circulation of antibiotics into what she calls an “industrialized biological” disclose how its history has become inscribed into the biology of bacteria itself. Revealing that history and biology are thoroughly entangled and matter to each other in ways that have serious consequences for antibiotic and human futures, she develops the concept of the “biology of history”, to demonstrate how ‘human historical events

and processes have materialized as biological events and processes and ecologies’.

Biology not only matters in this example, but what comes to be recognised and produced as biological data already bears the material traces of human and technological histories that cannot be divorced or separated from what takes form. As she suggests; ‘The bacteria of today are not the bacteria of yesterday, whether that change is registered culturally, genetically, physiologically, ecologically or medically’. This raises important questions about what exactly counts as biological data given the historicity of matter and the materiality of history and suggests that the important question of antibiotic resistance might be shifted away from ‘bacteria’ (understood as a ontologically distinct entity) to a new more relational ontological register.

The next article in the collection is multi-authored by Megin Warins, Vivienne Moore, Michael Davies and Stanley Ulijaszek entitled, “Epigenetics and Obesity: The Reproduction of Habitus through Intracellular and Social Environments”. The authors are concerned with the materiality of the body and how scientific insights into obesity might be used to further and extend already-existing theoretical concepts within the humanities. Their specific focus is Bourdieu’s concept of habitus and the Deleuzian concept of folding, and how the co-implication of the “natural and the cultural”, can be developed by engaging directly with obesity science. Their particular focus is the field of epigenetics and they argue like Rose and Abi-Rached (2013) for developing a ‘critical friendship’ with science. They draw specifically on what has come to be known as the “Barker hypothesis” or the “fetal origins hypothesis” within epigenetics. They read this work in novel ways in order to extend the developmental origins of Bourdieu’s concept of habitus and how to understand the transmission and embodiment of culture. They coin the term *biohabitus* to signal how biological data is being used to extend sociological concepts. Given the range of work that has drawn on Bourdieu’s concept of habitus, and particularly given the traction of Wacquant’s work within body studies[[4]](#endnote-4), there is much scope for theoretical and methodological innovation within this context. There are also tensions related to some of the issues outlined throughout this editorial introduction, which are characteristic of some contemporary biosocial and biocultural approaches.

The next article in the collection is written by Rebecca Yoshizawa entitled “Fetal-Maternal Intra-action: Politics of New Placental Biologies”. Yoshizawa is a sociologist studying the intersections of science and sociology and is a postdoctoral researcher at GeNa lab in the School of Communication at the Simon Fraser University[[5]](#endnote-5). In the article she forcefully argues for the relevance and importance of new materialist perspectives for bringing together reproductive science and the work of Karen Barad (2007). Engaging with the politics of reproduction she argues for a scientific underpinning for new materialism to be found within some of the contradictions, puzzles and anomalies within placental biologies. She argues that the concept of interaction between mother and fetus in terms of the placenta is pushed to its limits, when boundaries and thresholds between mother and fetus become difficult to distinguish.

Yoshizawa Builds on related work, including the work of Aryn Martin (2010) published in *Body & Society,* on microchimerism and fetal-material cell traffic. Informed by interviews with placenta scientists, as well as secondary sources on placental immunology and the developmental origins of health and disease, Yoshizawa explores evidence not of *interfacing* during pregnancy, but of *intra-action* (as developed by Karen Barad, for example), or the mutual emergence of entities in simultaneous practices of differentiation and connection. She argues that attending to evidence that can be figured as intra-action enables us to recognize, account for, and attend to diffuse responsibilities for fetal-maternal outcomes that extend beyond mothers to the biosocial milieus of pregnancy. In reimaging the intra-action of placentas, a new understanding of what constitutes a ‘healthy pregnancy’ becomes possible.

The final three papers in the collection all focus on immunology and the politics of immunity in different ways. Michelle Jamieson’s article titled “The Politics of Immunity: Reading Ed Cohen through Canguilhelm and New Materialism” has already been discussed previously. It develops a new materialist reading of Ed Cohen’s work in order to revitalize questions of the materiality of immunity within the context of historical archival work. The next article multi-authored by Mark Davis, Paul Flowers, Davina Lohm, Emily Waller, and Niamh Stephenson is titled “Immunity, Biopolitics and Pandemics: Public and Individual Responses to the Threat to Life”. The article draws from critical theory on immune-politics and bodily integrity within the context and threats of influenza pandemics and respiratory pathogens. The authors argue that corporeal life under microbial threat is informed by self/not-self, network and ‘choice’ immunity, and therefore makes considerable allowance for cosmopolitan traffic with others, microbes, ‘dirt’ and immune-boosting consumer products. The immuno-political orientation of members of the general public, therefore, appears to trend towards a productive cosmopolitanism that contrasts with more orthodox bioscientific and governmental approaches to pandemic influenza. The authors reflect on the implications of the immuno-cosmopolitanism of everyday life for the advent of global public health emergency and for biopolitical rule in general.

The last article in the collection is by Newman, Shields and McLeod titled “The MRSA Epidemic and/as Fluid Biopolitics”. In the article the authors offer a series of critical theorizations on the biopolitical dimensions of methicillin-resistant Staphylococcus aureus (MRSA), with specific attention to what has recently been referred to in the United States as the ‘MRSA Epidemic’. In particular, the authors reflect on the proliferation of biomedical discourses around the

‘spread’ and the pathogenic potentialities, of community-associated methicillin-

resistant Staphylococcus aureus(CA-MRSA). The authors turn to the work of Roberto Esposito and Jean-Luc Nancy to better make sense of how, during this immunological crisis, the individualized fleshy and fluid body is articulated to dimensions of community and corporeal proximity; the body is thus conceived in popular biopolitical framings as a site of transmission, inoculation, and isolation – as a living ecological and pathological vessel. The authors give emphasis to the spatial relations of flesh, namely in how biomedical ‘experts’ have sought to (bio-) technologize spaces of heightened communal bodily contact (such as playgrounds or gymnasia). The article maps potential pathways through which scholars of the body can begin to theorize what Roberto Esposito might refer to as the spatiality of biopoliticized flesh.

Given current concerns about the problem of antibiotic resistance with increasing resistance of certain bacteria and superbugs to current antibiotics, the issue has been raised by scientists, politicians, policy makers, medical researchers as a simultaneous technical, medical as well as important political issue. It is within this conjuncture that this special collection identifies some of what is at stake in how the sciences and humanities might go forward. This includes the possibility for potential shared attempts to shape adequate responses that open up new avenues for research, policy directions and strategies that draw from across the humanities and sciences. It is now incumbent on the humanities and social sciences to identify what contributions we can make to these global debates and problems and to convince scientists working in these areas that our research also matters.

1. This perhaps also takes us back to the importance of providing an account for what Foucault termed those “somatic singularities” (Foucault, 2006) that allow power to take hold. [↑](#endnote-ref-1)
2. See a publication by the Board of Life Sciences in 2009 titled, *A New Biology for the 21st century* [*http://www.nap.edu/catalog/12764/a-new-biology-for-the-21st-,century*](http://www.nap.edu/catalog/12764/a-new-biology-for-the-21st-century) [↑](#endnote-ref-2)
3. What Warin et al (in this issue) have termed “biohabitus” for example. [↑](#endnote-ref-3)
4. See especially the recent notes and commentary section responding to Loic Wacquant’s article, “*Homines in Extremis*: What Fighting Scholars Teach us About Habitus”. *Body & Society,* volume 20(2): 3-17. [↑](#endnote-ref-4)
5. <https://rebeccayoshizawa.com/>

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