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Veit Braun, S. Lafuente-Funes, Thomas Lemke, Ruzana Liburkina

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INTRODUCTION

Introduction to the special issue: Politics of suspension? Time, space, and control in cryopreservation practices

V. Braun[1] · S. Lafuente-Funes[2,1] · T. Lemke[1] · R. Liburkina[3,1]

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Cryopreservation practices—the freezing of vital material for future use—have had a significant impact on concepts of life and death, health and disease, (in)fertility and biodiversity in many different areas of society, such as reproductive and regenerative technologies, biomedical research, conservation biology and biosecurity preparedness. They create a liminal space in which cells, body parts and DNA samples diverge from the temporality of the outside world but remain available to be reintroduced into it. The radical transformation of temporal trajectories brought about by cryotechnologies opens up a wide range of technoscientific possibilities and generates new modes of storing, processing and managing biological material.

The social, cultural and ethical dimensions of cryopreservation practices have increasingly been explored in science and technology studies, anthropology and sociology (Katz et al. 2020; Kroløkke et al. 2020; Braun et al. 2023). Within this body of research, the concept of cryopolitics has attracted much scholarly attention (Friedrich and Höhne 2014; Kowal and Radin 2015; Radin and Kowal 2017). Drawing on Michel Foucault's work on biopolitics, it highlights the effect of cryopreservation on life and its governance: arresting the processes of decay and death as well as those of reproduction and development, cryopolitics produces a form of "latent life" (Kowal and Radin 2015). Latent life is not allowed to die, nor is it allowed to live. In keeping vital material in a limbo between life and death, cryopolitics at the same time articulates the speculative and promissory dimensions of cryopreservation.

This special issue of *BioSocieties* extends this work on cryopolitics by engaging more closely with the political issues at stake when life is suspended in ice. Rather

✉ V. Braun
braun@soz.uni-frankfurt.de

[1] Institute for Sociology, Goethe University Frankfurt am Main, Theodor-W.-Adorno-Platz 6, 60323 Frankfurt am Main, Germany

[2] Department of Sociology: Methodology and Theory, Complutense University of Madrid, Campus de Somosaguas, 28223 Madrid, Spain

[3] Institute for Anthropological Studies in Culture and History, University of Hamburg, Edmund-Siemers-Allee 1 (West), 20146 Hamburg, Germany

than focusing on latency and potential, however, the contributions analyse cryopractices as part of a broader "politics of suspension" that "both reserves time to keep options open and conceives of cryopreserved organic material as a standing reserve" (Lemke 2023: p. 709). In this understanding, the politics of suspending life in cryobanks is also in line with the current "regime of anticipation" (Adams et al. 2009), extending the present by suppressing metabolic processes and postponing change. Suspending life rearranges temporal pathways and promotes a specific mode of future-making that prolongs the present by ensuring reversibility (Wolff 2021; Lemke 2023; Braun et al. 2023).

Following up on this work, this special issue focusses on the role of suspension for and in politics.[1] The inquiry on the politics of suspension is based on an analysis of "suspended life", exemplified by frozen cells and tissues—a peculiar biological state between or beyond life and death. From this point of view, cryopreservation practices detach life from its biological time and ecological networks, leaving isolated pieces of organic material in a state of suspension. In order to do this, however, these materials have to be re-entangled in various technological assemblages and infrastructures that support them in suspension: protective solvents, liquid nitrogen, a constant supply of electricity and gases, an extensive apparatus for keeping track of the frozen materials in space and time.

The analytical framework of a politics of suspension attends to this dynamic process of dissociation and reattachment, of rupture and continuity. It proposes a double line of inquiry, linking the problematisation of 'politics' with the questioning of the meaning of 'suspension'. The question mark in the title of this issue opens up a series of investigations about both politics and suspension. It inquires into the relationship between the logic of suspension and contemporary political rationalities: how does suspension extend or irritate a linear understanding of time and a neoliberal subjectivity that seeks to responsibly manage personal fertility, for example (Waldby 2019; van de Wiel 2020)? It also raises issues of equity and epistemic blindness: when we speak of suspension, what can be kept in suspension and what cannot (Bird Rose 2017)? Similarly, the question mark investigates the hierarchy between suspension and politics: are the technologies of freezing and storing simply a tool of a pre-existing politics, or do they carry potential for circumventing or changing politics? Finally, it also allows us to draw into question the notion of 'suspension' itself: if freezing life does not simply preserve but rather transform cells, tissues, embryos and fluids, does it belie the desire for stasis and conservation?

Thomas Lemke opens the issue with a renewed reflection on the relationship between suspension and the logics of anticipation. His piece situates current debates around cryopolitics (Radin and Kowal 2017) and further substantiates the notion of

[1] The contributions to this special issue are based on papers presented at a conference entitled "Politics of Suspension? Time, Space, and Control in Cryopreservation Practices," held at the Goethe University in Frankfurt am Main, Germany. It took place after a long period of suspension of face-to-face academic activities due to the COVID-19 pandemic.

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'suspended life', relating the freezing of time in the nitrogen tank to the deferral of the future outside of it. Suspension, for Lemke, is linked to the rationalities of anticipation in contemporary societies. The pervasive imperative to consider and address the future and its risks facilitates the use of cryopreservation in many fields. Lemke here points to the particular promise of cryopreservation practices to attend to the future by extending the present in which action can be taken. In particular, this piece invites further reflection on how cryopractices relate to the logics of preparedness (Lakoff and Collier 2010). It also invites the reader to consider the inequalities and exclusions that arise in a context in which some are recognised as being able to "cultivate forward-looking anticipatory capacities" (Lemke in this issue) while others are not.

Leon Wolff approaches these issues through the lens of seed preservation. His paper traces how cryopractices have gained prominence in this field and how the ex situ approaches they entail affect which materials can become objects of care. According to Wolff, the increased use of cryopreservation in biodiversity conservation is shaped by a 'pure line ontology' (Bonneuil and Thomas 2010) and 'an imaginary of ecological separation' (Wolff in this issue). Freezing plant biodiversity only works if it can rely on the physiological and genetic purity and stability of seeds produced by certain plants. Where seeds do not survive freezing and thawing, or do not yield homogeneous plants, the limitations of suspending them on ice become apparent. A politics of conservation that relies on a particular type of seed fails to account for the diversity of plants outside the bank, Wolff emphasizes. Besides, it leaves little space for developing practices of suspension that account for more unruly plants. The politics of suspension are, in this case, part of a hegemonic approach to conservation that may be moving us further away from, rather than closer to, sustaining diverse ecologies.

Seed banks are not alone in their fixation upon a singular, simplified rationale. In her contribution, Ruzana Liburkina explicitly problematises the affordance of cryotechnological suspension to sustain hegemonic projects and ideas in medical biobanking. Given its apparent tendency to support and extend established rationales, she suspects, there might not even be such a thing as a distinct politics of suspension. Instead, she urges researchers to inquire how particular cryopreservation projects relate to other imperatives prevalent in their respective fields. Like Wolff's, Liburkina's contribution demonstrates the epistemic value of thinking with materials that resist suspension. Through a detailed account of an organisation's futile attempt to promote a new cryopreserved product, she shows the limits of logics of suspension when they are not linked to other, broader political visions and objectives. Liburkina mobilises the notion of "outside politics" (Stephenson and Papadopoulos 2006) and its subversive potential to argue that projects of suspension only gain traction when they emerge from within entrenched politics. The politics of suspension, then, is conditional on other politics.

Sara Lafuente-Funes's article on personal fertility management in Spain supports Liburkina's argument. Lafuente-Funes analyses commercial egg freezing as a prime example of cryopreservation as a success story—a project of suspension that is deeply intertwined with broader gender, family and productivist ideologies. By following the critical views of women freezing their eggs on reproductive markets,

policies and politics in the country, it becomes clear that many types of politics are working together for the success of fertility preservation in this context. However, as Lafuente-Funes's contribution clearly shows, the users of cryopreservation services are well aware of and highly reflexive about their political preconditions and effects. Neoliberal ideas mix with critical views of neoliberalism when women adopt the very strategies they consider inefficient to deal with the broader problems they encounter. There is no room for black or white here: instead, there are contradictions, ambiguities and complexities. Women who long for social change on a larger scale act individually instead, freezing their eggs. Lafuente-Funes' insights suggest that cryotechnological suspension can both solve and escalate problems.

The framework of the politics of suspension not only opens up a horizon for asking how 'interrupted life' (Anderson 2015: p. 379) is mobilised in contemporary political strategies. It also allows us to problematize 'suspension' as an operational fiction. The imaginary of freezing as the suspension of biological decay and a cessation of metabolic processes has largely been taken for granted by works in STS, anthropology and sociology. In her contribution Hannah Landecker undermines this common framing of cryopreservation as simple and straightforward conservation. She reveals the relevance of dimethyl sulfoxide (DMSO), a chemical agent designed to prevent cellular damage during the freezing process. 'Agent' should be taken seriously in this context: as an integral element in the processes of suspension, DMSO inscribes itself into the organic matter it is supposed to protect, transforming cells, tissues and potentially DNA in the process. The politics of suspension permeates the basic chemical composition of biological material—with unknown, potentially detrimental effects that are consistently overlooked. Landecker's article extends the politics of suspension beyond questions of delayed decision-making, unequal access to technological options, or reductionist strategies of biological conservation to challenge the very idea of freezing as stasis. What, she asks, are the risks posed by the 'success' of cryoprotectants in preserving life through freezing and thawing? Why do we accept certain risks in freezing cells whilst avoiding others *at all costs*? Landecker's understanding of the formula 'politics of suspension' opens our analytical gaze to the political issues at stake: who is affected by the transformations induced by cryopreservation?

Each in its own way, the five papers in this issue offer an empirically rich understanding of the various dimensions of a politics of suspension. They approach it from the vantage point of its grand political rationales as well as its basic chemical workings, from the neglected margins of cryopractices as well as its successful core, from the perspectives of its users as well as its makers, and across multiple domains of its application. The contributions show that cryopractices promise to suspend biological material in time and space (Lemke), but that these practices do not look like suspension when analysed in chemical terms (Landecker). They may play a role in suspending political action (Lafuente-Funes) but are also subject to explicit political negotiation (Wolff). Cryopreservation practices are instrumental in promoting reductionist and productivist ideologies (Wolff), but they might also be incompatible with them and can fall through their cracks (Liburkina). Cryopreservation is mobilised in the name of preparedness (Lemke), but it carries neglected risks that no one is willing or able to prepare for (Landecker).

In his afterword to this special issue, Klaus Hoeyer stresses that the 'analytic kaleidoscope' (Hoeyer in this issue) of a politics of suspension, despite the seemingly mundane and neutral technologies of cryopreservation on which it relies, allows us to see the societal changes and choices involved. It makes visible the infrastructures that create potentials for (political) action—and undermines or postpones alternative trajectories and options. The possibility of suspension opens up space for a particular kind of politics, one that operates through an attentiveness to both the pressing concerns of the present and the looming risks of the future. At the same time, it closes the space for politics: by delaying action that would otherwise be taken, by forcing people to turn into a private matter what would otherwise be a public concern, by ignoring what is sacrificed in order to keep life suspended. For Hoeyer, the prism of the politics of suspension urges us to expose these hidden moral and political stakes of cryopreservation practices. By insisting that suspension is a form of politics (by other means), he opens up new questions of agency and a politics of life beyond the human. We should therefore, Hoeyer argues, take up Landecker's notion of the 'gestalt switch' (this issue): learning to see politics in suspension where it currently escapes our attention.

The contributions to this issue open up the notions of politics and of suspension. They allow us to see the excluded others, the dismissed alternatives, the invisibilised costs to make suspension work. It would be tempting, then, to conclude that we need to reject the politics of suspension on these grounds. The texts collected here resist this temptation, however. Instead, they ask us to weigh what has so far been overlooked, muted or invisibilised by the way we speak and think about suspension against its promises. Do these promises—an everlasting present, a perfect preservation, a failsafe preparation for the future—appear broken when assessed from the perspective of what they exclude? Or do they warrant reformulation, intervention and revision to make better use of suspended life? This issue does not tell us whether to embrace or oppose the politics of suspension. Instead, it provides us with a repertoire for problematizing suspension, opening up normative questions: what could a good, a *better* politics of suspension look like?

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V. Braun is a postdoctoral research associate at the Institute for Sociology, Goethe University Frankfurt am Main, Germany. In his PhD thesis *At the End of Property*, published by Bristol University Press in 2024, he explores the crisis of property in plant science and the seed industry. He has been part of the CRYOSOCIETIES ERC project since 2019, where he studies how animal biobanks collect, store and circulate their samples as well as their role in contemporary biodiversity conservation. Braun's research interest centres around how different forms of politics and rule are distinguished but keep intersecting with each other.

S. Lafuente-Funes is a feminist sociologist, currently working at the department Sociology: Methods and Theory of the Universidad Complutense of Madrid, Spain. She has specialized on the topic of assisted reproduction and reproductive markets in Spain since her PhD (2012–2017), and later focused on studying cryopreservation technologies through her participation (2019–2024) in the project CRYOSOCIETIES, led by Thomas Lemke at Goethe University Frankfurt. This paper is a result of that project and part of a lasting collaboration with Thomas Lemke, Veit Braun and Ruzana Liburkina.

T. Lemke is Professor of Sociology with a focus on biotechnologies, nature and society at the Faculty of Social Sciences of the Goethe-University Frankfurt am Main. His most recent book publication is *The Government of Things: Foucault and the New Materialisms* (NYU Press, 2021).

R. Liburkina is Assistant Professor of Anthropological Studies in Culture and History at the University of Hamburg, Germany. She graduated in social & cultural anthropology and european ethnology and

received her doctoral degree from the Humboldt University of Berlin. Her contributions to this special issue are grounded on her work as a research associate at the Goethe University Frankfurt (2019–2024) where she investigated the cryopreservation of human cells. Liburkina is an ethnographer whose research is situated at the intersection of anthropology and STS.