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### Freezing fertility: Oocyte cryopreservation and the gender politics of ageing

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**Publication date**

2015

**Document Version**

Final published version

[Link to publication](#)

**Citation for published version (APA):**

van de Wiel, L. (2015). *Freezing fertility: Oocyte cryopreservation and the gender politics of ageing*. [Thesis, fully internal, Universiteit van Amsterdam].

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## Glossary

ACT	Advanced Cell Technology. A US biotechnology company focusing on regenerative medicine. Renamed Ocata Therapeutics, Inc. in 2014.
AMC	Academic Medical Center [ <i>Academisch Medisch Centrum</i> ]. Dutch university hospital in Amsterdam.
ART	Assisted reproductive technology
ASRM	American Society for Reproductive Medicine
Autologous	Autologous donations are donations for a person's own (future) use.
CBRC	Cross-border reproductive care
Cytoplasm	The cell's cytoplasm consists of all the contents of the cell besides the nucleus.
ESHRE	European Society of Human Reproduction and Embryology
FSH	Follicle-stimulating hormone
Fimbriae	The fimbriae of the fallopian tube are long, finger-like tissues positioned close to the ovary. When ovulation occurs, the fimbriae become engorged with blood and reach out towards the ovary. With a sweeping motion, they guide the ovulated egg into the fallopian tubes.
hESCs	Human embryonic stem cells. These stem cells may be derived from the inner cell mass of the embryo and can differentiate into various cell types.
Heterologous	Heterologous donations are donations from one person to another.
HFEA	Human Fertilisation and Embryology Authority (UK)

ICSI	Intra-cytoplasmic sperm injection. An embryological technique for fertilisation in which the embryologist inserts a single sperm cell into an egg through micro-injection. This differs from conventional IVF, in which an egg is placed in a petri dish with sperm.
iPSCs	Induced pluripotent stem cells. These stems cells are generated from somatic cells without the use of eggs and can differentiate into various cell types.
IVF	<i>In vitro</i> fertilisation
IVM	<i>In vitro</i> maturation
KLEM	Association of Clinical Embryology [ <i>Vereniging voor Klinische Embryologie</i> ]
LH	Luteinising hormone
OC	Oocyte cryopreservation, technical term for egg freezing.
OHSU	Oregon Health and Science University
OSC	Oogonial stem cells. Germline stem cells in the ovarian lining that are hypothesised to produce eggs.
Nucleus	The nucleus of a cell is a structure that holds the cell's DNA, RNA and nuclear proteins. A membrane called the nuclear envelope separates it from the cell's cytoplasm.
NVOG	Dutch Association of Obstetrics and Gynaecology [ <i>Nederlandse Vereniging voor Obstetrie en Gynaecologie</i> ]
TLEB	The London Egg Bank
SCNT	Somatic cell nuclear transfer, a technique for creating an embryo from an egg and a somatic cell, also known as “cloning.”

Somatic cell	A somatic cell is any cell of the body that is not a sperm or egg cell.
TWEB	The World Egg Bank
Zona pellucida	A protein layer surrounding the outer egg's membrane that binds the sperm in fertilisation. Egg freezing damages the zona pellucida and is therefore an indication for ICSI.

## Summary

### *Freezing Fertility: Oocyte Cryopreservation and the Gender Politics of Ageing*

*Freezing Fertility* critically examines the introduction of oocyte cryopreservation (egg freezing) in the early 21<sup>st</sup> century and investigates how the advent of this new reproductive technology shifts cultural constructions of the relation between reproductivity and ageing. As a reproductive technology that is employed for “fertility preservation” rather than immediate childbearing, the possibility of oocyte cryopreservation both triggers the articulation of existing age normativities and reconfigures the temporal logic of reproductive ageing. I investigate the implications of oocyte cryopreservation for contemporary thinking on bodily temporality by analysing a selection of cultural objects—varying from documentaries and newspaper coverage to informed consent contracts and medical photography—which are emblematic for each stage of the egg freezing procedure. Accordingly, *Freezing Fertility* follows the journey of the egg: starting from the initial anticipation of reproductive ageing in relation to *in vivo* eggs, followed by the visual mediation of *in vitro* eggs after extraction, the selection of fertilised eggs with time-lapse embryo imaging, the novel forms of older motherhood following the implantation of fertilised frozen eggs, and, finally, the global impact of egg freezing as a condition of possibility for the transnational flows of eggs that can emerge once cryopreservation renders the egg newly mobile. At each stage of the procedure, the relation between bodily and cellular time is problematised to give insight into broader cultural ideas about ageing and their intersection with the politics of gender and reproduction.

In order to introduce the primary terms of debate through which egg freezing is politicised in public discourses, Chapter 1 offers a media analysis of OC’s coverage in two Dutch and UK newspapers. One important element in these public narratives is the categorisation of “medical” versus “social” and “single” versus “lifestyle” freezing in pairings that function as rhetorical tools in condoning and criticising OC practices. With these oppositions emerge a set of new subject positions through which women’s reproductive, romantic and life course decision-making becomes subject to public scrutiny. Similarly, the trope of the “biological clock” and the egg-focused conceptualisations of age-specific (non-)reproductive bodies both shape the need for and the nature of the reproductive choice associated with OC. Whether as false promise, unnatural transgression, or pragmatic solution, egg freezing operates at the tension between the simultaneous rejection and suggested inevitability of the future non-reproductive body that is invoked in OC’s newspaper coverage. My reading of this newspaper coverage reveals a gendered politics of ageing, predicated on reproductive ability as the organising principle for the temporal structuring of life, which at once

interpellates a contingent of women who may want to reproduce later in life and positions their reproductive decision-making as a public concern.

In order to understand the historical specificity of these conceptualisations of female reproductive body, their relation to time and the cultural implications thereof, OC's advent needs to be positioned in a longer history of medicalising women's reproductive ageing. In Chapter 2 I do so by discussing a critical juncture in this history: the mid 19<sup>th</sup>-century discursive construction of menopause as pathology. Through a close reading of the first English book-length medical treatises on menopause by E. J. Tilt alongside Michel Foucault's *Birth of the Clinic*, I discuss how normative ideas about aging and reproductive embodiment became conceptually linked in the medicalisation of female midlife. Tilt's construction of menopause as a foreseeable yet potentially dangerous stage of ageing was predicated on an epochal organisation of the female life course organised by changes in women's reproductive organs. Once grouped together and conceptualised as signs of menopause, the concurrent normalisation and pathologisation of physical changes in women's reproductive bodies naturalised norms of maternity, modesty and sexuality associated with female midlife. The emphasis on menopause's dangers affirmed the need for expert management and self-scrutiny according to these norms both at the time of the change and during its anticipation. From this analysis emerged three mechanisms concerning the naturalisation of age normativity, the visualisation of physical ageing and the disciplinary effects of bodily futurity, all of which have continued relevance in the study of 21<sup>st</sup>-century egg freezing and reproductive ageing.

The disciplinary effects of bodily futurity in particular play a key role in Chapter 3, which focuses on the *in vivo* egg and the new cultural and clinical practices of anticipating bodily futurity that emerge with OC. The Dutch documentary *Eggs for Later* (Schellart, 2010), which features diverse medical, political and personal discourses on egg freezing, gives insight into the anticipatory terms and affective states through which women's future age-related infertility is conceptualised in relation to the medical possibility of cryopreserving eggs. My analysis of the documentary draws attention to the contesting interpretations of egg freezing as postponement of motherhood, extension of fertility and biopreparedness for future infertility. What is at stake is the potential of various modes of anticipating bodily futurity to reconfigure ideas and practices of what constitutes healthy embodiment, the reproductive process and responsible ageing. With my reading of *Eggs for Later*, I argued that egg freezing may function not only to potentially achieve future reproduction, but also to resolve anticipatory anxiety by maintaining the futurity of potential motherhood.

Once extracted and frozen, the emergent cultural entity of the cryopreserved egg becomes meaningful through its visual and textual mediations. Now that frozen eggs

may continue to exist for extended periods of time outside of the body, photomicrography of eggs becomes a means for relating to them while they remain in the freezer. In Chapter 4 I discuss this phenomenon in a case study of the public presentation of a frozen egg by a woman who underwent OC. With the online alias “Eggfreezer,” she uses the Blogspot platform to offer an account of her experience that features a photograph of her cryopreserved egg. Eggfreezer’s self-imaging with the egg’s photograph engages various models of cellular ageing, in which the egg is positioned as the first stage in an observable reproductive continuum, as embodying an independent life span and as averting death in cryopreservation by being removed from the ageing body. Eggfreezer’s online presentation of this image is a testimony to her agentic approach to altering the declining telos of reproductive ageing and reimagining it as distributed and plastic. By bringing together the “frozen moment” of the photographic image and the egg “frozen in time,” the cellular portrait offers the occasion to consider a contemporary moment in which the manipulation of biological time changes what it means to age as much as culturally specific ideas about ageing—in this case mobilised by the photographic image of the egg—change what it means to manipulate biological time.

After the eggs are fertilised *in vitro*, it has to be decided which of them will be implanted in the womb in a process called embryo selection. At this stage of the procedure, the now fertilised eggs can once more be visualised, this time in videos produced through time-lapse embryo imaging. This selection method, which became available as a routine option in UK clinics in 2013, foregrounds cellular temporality as a determining factor in anticipating the embryos’ future viability. In keeping with this study’s focus on ageing, in Chapter 5 I draw attention to the visualisation and instrumentalisation of embryonic ageing in time-lapse embryo imaging by analysing the production of a new set of images of fertilised eggs and their division into embryos that circulate beyond the laboratory in the clinic, the patient’s private sphere and public discourses. I focus on the framing of the embryo videos by biotechnology company Auxogyn and analyse the time-lapse imaging systems themselves as the conditions of emergence for the embryo videos. Emerging in the wake of an increasingly visual interface with prenatal life, such as the iconic imagery of micro-injection and fetal ultrasound, both of which have had a profound impact on the public and private imagination of the reproductive process, time-lapse embryo videos add yet another visual dimension to the encounter with early human life on screen. The instrumentalisation of these images in the clinical context and in patenting procedures generates new risks and “biovalue” as a result of the temporalisation of embryo selection (Waldby 2002). This method of embryo selection then may not just result in more or less “IVF success,” but also affects the conceptualisation, representation and commercialisation of ageing at an embryonic level.

If selected, the egg's—now embryo's—journey proceeds to implantation into the intended mother's womb in what is described as the second phase of OC. Chapter 6 focuses on this stage and explores how the introduction of egg freezing is indebted to and shifts existing cultural constructions of “older motherhood.” With a critical reading of the documentary *Granny's Having a Baby* and the informed consent forms used in egg freezing procedures, I distinguish three new forms of technologically-mediated older motherhood that co-emerge with OC: willful, genetically related and posthumous motherhood. With an analysis of these forms of older motherhood, I draw attention to the age-specificity of the “reproductive will” (Ahmed 2014, 112), the way in which OC may shift the logic of the age-related recognisability of genetic relatedness and the discursive effects of the informed consent forms for a temporally-contingent reclassification of the eggs and the formation of intended kinship bonds.

However, given that only a very limited percentage of cryopreserved oocytes result in live births, motherhood—older or not—is not a self-evident endpoint of either the egg's journey or this study on egg freezing. Consequently, Chapter 7 zooms out to offer a reflection on the spatial trajectories of frozen eggs that become feasible as cryopreservation renders the egg newly mobile. Once frozen, the eggs become as portable as the liquid nitrogen tanks that contain them; egg freezing is thus a key condition for the development of global flows of eggs propelled by reproductive and research needs in egg donation networks. The US-based World Egg Bank, which I discuss in this chapter, ships frozen eggs to clinics worldwide and provides a case study for a consideration of the implications of the transnational mobility of frozen eggs for reproductive egg donation and concomitant reconceptualisations of reproductive ageing. The possibility of shipping and banking eggs moreover becomes relevant as the question of research egg procurement is revived by long-awaited successes in human stem cell research (SCNT) in 2013. Given the potential clinical applications, financialisation and regulation of stem cell research, and its dependence on large amounts of oocytes provided by young women, the egg adopts a pivotal position within a broader global biopolitics of ageing. As the egg travels across bodies and geopolitical boundaries, as it is instrumentalised to halt, counteract or regenerate age, OC's emergence radically transforms how the passage of time becomes meaningful, visible and political in bodies and eggs alike.

With these case studies, *Freezing Fertility* argues that egg freezing is a reproductive technology with important cultural effects pertaining to the renegotiation and reconfiguration of the relation between ageing and reproductivity. I draw attention to the disciplinary effects of anticipating age-related infertility as a mode of biopreparation, the appeal to gender-specific chrononormativity in celebrating or challenging the use of OC, the cultural specificity of situating (reproductive) life's origin



and finitude at various points in the lifespan and the age-specific interpellation of women to freeze their eggs, whether for their own or another's use. The visual interface with prenatal life in photomicrographs of eggs is employed to reflect on the reconfiguration of reproductive ageing as plastic and distributed, while time-lapse videos of embryos visualise and instrumentalise embryonic ageing in ways that redistribute responsibility for embryo selection between patients, clinics and companies. With the founding of egg banks and the emergence of global flows of eggs, egg freezing is no longer exclusively a technology for "fertility preservation," but also a tool for extending the infrastructure for the exchange of eggs between bodies and institutions. The 21<sup>st</sup>-century introduction of egg freezing reflects a historically-specific moment which is both informed by a gender-specific tradition of medicalising reproductive ageing and the absence of several potential technological alternatives for fertility preservation that are currently being researched.

The egg that, having been vitrified *in vitro*, remains viable bears a complex relation to the gender politics of ageing. The possibility of freezing eggs both affirmed and shifted chrononormative ideas about when fertility may be assumed, when infertility should be anticipated, when nonreproduction turns into postponement, when women should have children and who is entitled to pass public judgment on the basis of these questions. The frozen egg has been described as defying the biological clock, yet in OC's public representations this very notion, its naturalising effects and anxious affects, are actively produced and abundantly reiterated. Paradoxically, the extraction of eggs brings their embodiment into discourse. Their frozen stasis renders them globally mobile. The egg, seen to embody the promise of new human life and reproductive futurity, is frozen in a practice that also entails a confrontation with finality. These complex counterpoints of OC, of fertility and finitude, meet in the figure of the egg. The egg, frozen, its age suspended, has become the locus for grappling with the beginning and end of life, and the mortal passage from one to the other.

## Samenvatting

### *Bevroren vruchtbaarheid: Eicelpreservatie en de genderpolitiek van leeftijd*

*Bevroren vruchtbaarheid* is een kritische beschouwing over de introductie van eicelpreservatie (eicellen invriezen) in de vroege 21<sup>e</sup> eeuw. Het onderzoekt hoe de opkomst van deze nieuwe reproductieve technologie veranderingen teweegbrengt in culturele constructies van de relatie tussen reproductiviteit en leeftijd. Eicelpreservatie is een reproductieve technologie die niet gericht is op voortplanting op korte termijn, maar op “vruchtbaarheidspreservatie.” De nieuwe, toekomstgerichte reproductieve keuze die hieruit volgt geeft aanleiding tot de uiting van bestaande leeftijdsnormativiteiten en tot een reconfiguratie van de temporele logica van reproductieve veroudering. Ik onderzoek de implicaties van eicelpreservatie voor contemporaine denkbeelden over lichamelijke temporaliteit door een selectie van culturele objecten te analyseren. Deze objecten—variërend van documentaires en kranten tot toestemmingsverklaringen en medische fotografie—zijn emblematisch voor ieder stadium van de eicelpreservatie procedure. *Bevroren vruchtbaarheid* volgt derhalve de reis van de eicel: van de aanvankelijke anticipatie van reproductieve veroudering in relatie tot de *in vivo* eicellen, gevolgd door de visuele mediatie van *in vitro* eicellen na de extractie, de selectie van bevruchte eicellen met behulp van *time-lapse embryo imaging*, de nieuwe vormen van oudermoederschap die volgen op de implantatie van bevruchte voorheen-bevroren eicellen en, ten slotte, de mondiale impact van eicelpreservatie als een mogelijkheidsvoorwaarde voor het ontstaan van transnationale stromen van eicellen wanneer cryopreservatie de gameet mobiel maakt. Voor ieder stadium van de procedure problematiseer ik de relatie tussen lichamelijke en cellulaire tijd om inzicht te krijgen in bredere culturele ideeën over leeftijd en hun intersectie met de politiek van gender en reproductie.

Om de centrale termen van het debat te introduceren waarmee het invriezen van eicellen gepolitiseerd wordt in publieke discoursen, biedt Hoofdstuk 1 een media-analyse van de berichtgeving over eicelpreservatie in een Nederlandse en een Britse krant. Een belangrijk element in deze publieke narratieven is de categorisering van eicelpreservatie in “medisch” versus “sociale” en “single” versus “lifestyle” tegenstellingen, welke een retorische functie krijgen in het accepteren en bekritisieren van het invriezen van eicellen. Met deze tegenstellingen ontstaat een verzameling subjectposities waarmee de reproductieve, romantische en leeftijdsgerelateerde besluitvorming van vrouwen onderwerp wordt van publieke opinievorming. De troep van de “biologische klok” en de op eicellen gerichte conceptualisaties van reproductieve leeftijd zijn van invloed op zowel de behoefte aan als de aard van de reproductieve keuze die geassocieerd wordt met eicelpreservatie. Of het nu gezien wordt als valse belofte, onnatuurlijke transgressie of pragmatische oplossing, het invriezen van eicellen opereert in het spanningsveld tussen de afwijzing en de gesuggereerde onvermijdelijkheid van het toekomstige niet-reproductieve lichaam, die veelvuldig besproken wordt in de nieuwsberichtgeving van

eicelpreservatie. Uit mijn lezing van deze nieuwsberichtgeving volgt een genderpolitiek van leeftijd, welke gestoeld is op reproductief vermogen als het organiserend principe voor de levensplanning. Deze berichtgeving spreekt een groep vrouwen aan die mogelijk later kinderen wil krijgen en positioneert hun reproductieve besluitvorming als een publiek vraagstuk.

Om de historische specificiteit van deze conceptualisaties van het vrouwelijk reproductieve lichaam te begrijpen is het noodzakelijk om de opkomst van eicelpreservatie te positioneren binnen een langere geschiedenis van de medicalisering van de reproductieve veroudering van vrouwen. In Hoofdstuk 2 doe ik dit door een kritiek punt in deze geschiedenis te bespreken: de midden-19<sup>e</sup>-eeuwse discursieve constructie van de menopauze als pathologie. Ik doe dit aan de hand van een *close reading* van E.J. Tilts *The Change of Life*, het eerste Engelse medische boek dat volledig gewijd was aan de menopauze, en Michel Foucaults *The Birth of the Clinic*. De lezing van deze bronnen richt zich op de vraag hoe normatieve ideeën over leeftijd en reproductieve belichaming conceptueel verbonden worden in de medicalisering van middelbare leeftijd bij vrouwen. Tilts constructie van de menopauze als een te voorziene, maar desalniettemin mogelijk gevaarlijke periode in het verouderingsproces was gebaseerd op een periodieke [*epochal*] organisatie van de vrouwelijke levensloop op basis van veranderingen in de reproductieve organen. Deze veranderingen werden gegroepeerd en geconceptualiseerd als tekens van de menopauze. De gelijktijdige normalisatie en pathologisering van fysieke veranderingen in de reproductieve lichamen van vrouwen naturaliseerde normen van moederschap, kuisheid en seksualiteit die geassocieerd werden met de middelbare leeftijd. De nadruk op de gevaren van de menopauze bevestigde de noodzaak voor behandeling door een expert en zelfbevraging volgens deze normen zowel tijdens de menopauze als gedurende de anticipatie ervan. Met deze analyse identificeer ik drie mechanismen die betrekking hebben op de naturalisatie van leeftijdsnormativiteit, de visualisatie van lichamelijke leeftijd en de disciplinaire effecten van lichamelijke toekomstigheid. Alle drie hebben aanhoudende relevantie in de bestudering van het invriezen van eicellen en reproductieve leeftijd in de 21<sup>e</sup> eeuw.

De disciplinaire effecten van lichamelijke toekomstigheid spelen een belangrijke rol in Hoofdstuk 3, waarin de *in vivo* eicel en de nieuwe culturele en klinische praktijken van het anticiperen van lichamelijke toekomstigheid d.m.v. eicelpreservatie centraal staan. De Nederlandse documentaire *Ei voor Later* (Schellart, 2010), waarin diverse medische, politieke en persoonlijke discoursen over het invriezen van eicellen aan bod komen, geeft inzicht in de termen en affectieve staten van anticipatie waarmee de toekomstige leeftijdsgerelateerde onvruchtbaarheid wordt geconceptualiseerd in relatie tot de medische mogelijkheid om eicellen in te vriezen. Mijn analyse van de documentaire besteedt aandacht aan drie concurrerende interpretaties van het invriezen van eicellen als uitstel van moederschap, verlenging van vruchtbaarheid en biogereedheid [*biopreparation*] voor toekomstige vruchtbaarheid. Deze verschillende

benaderingen om te anticiperen op lichamelijke toekomstigheid kunnen van invloed zijn op ideeën en praktijken m.b.t. gezondheid, het reproductieve proces en verantwoordelijk ouder worden. Met mijn lezing van *Ei voor Later* stel ik dat het invriezen van eicellen niet alleen de functie heeft om mogelijke toekomstige reproductie te bewerkstelligen, maar ook om een angst die gepaard gaat met anticipatie te verhelpen door de toekomstigheid van potentieel moederschap te bewaren.

Na de extractie en bevroering ontstaat de nieuwe culturele entiteit van de bevroren eicel, die betekenis toegeschreven krijgt door visuele en tekstuele mediaties. Nu bevroren eicellen langdurig buiten het lichaam kunnen blijven bestaan, biedt de fotomicrografie van deze cellen een middel om een relatie met de eicellen te bewerkstelligen terwijl ze in de vriezer liggen. In Hoofdstuk 4 bespreek ik dit fenomeen aan de hand van een casus van een vrouw die haar eicellen ingevroren heeft en de bevroren gameet publiekelijk presenteert. Onder de naam “Eggfreezer” gebruikt ze het online platform Blogspot om uitleg te geven over haar ervaring, o.a. aan de hand van een foto van haar ingevroren eicel. Eggfreezer’s zelfverbeelding [*self-imaging*] d.m.v. de foto van de eicel refereert aan verschillende modellen van cellulaire veroudering, waarin de eicel wordt gepositioneerd als de eerste fase in een waarneembaar reproductief continuüm van prenataal leven, alsmede als een individuele cel met een eigen levensspanne die aan de sterfelijkheid kan ontsnappen door het verouderende lichaam te verlaten. Eggfreezer’s online presentatie van dit beeld geeft inzicht in haar invloed op eicelveroudering, waardoor het heersende idee van progressief verval anders voorgesteld kan worden, namelijk als een gedistribueerd en plastisch model van reproductieve leeftijd. Door het “bevroren moment” van het fotografische beeld en de “bevroren tijd” van de eicel bij elkaar te brengen, biedt het cellulaire portret de mogelijkheid om te reflecteren op een contemporain moment waarin de manipulatie van biologische tijd de betekenis van leeftijd verandert, net zoals cultureel specifieke ideeën over leeftijd—in dit geval gemedieerd door het fotografische beeld van de eicel—de betekenis van het manipuleren van biologische tijd veranderen.

Nadat de eicellen *in vitro* zijn bevrucht, moet er besloten worden welke in de baarmoeder geïmplant worden zullen worden in een proces dat embryoselectie heet. In deze fase van de procedure kunnen de inmiddels bevruchte eicellen nogmaals gevisualiseerd worden—ditmaal met video’s die geproduceerd worden met *time-lapse embryo imaging*. Deze selectiemethode werd beschikbaar als een routineprocedure in Britse vruchtbaarheidsklinieken in 2013. Het stelt cellulaire temporaliteit centraal als een bepalende factor in de anticipatie van de toekomstige levensvatbaarheid van de embryo’s. Gegeven de focus op leeftijd in deze studie, vestig ik in Hoofdstuk 5 aandacht op de visualisatie en instrumentalisering van embryonale leeftijd in *time-lapse embryo imaging* d.m.v. een analyse van de productie van een nieuwe groep beelden van bevruchte eicellen en hun deling tot embryo’s, die niet alleen circuleren binnen het laboratorium, maar ook in de kliniek, in de privésfeer van de patiënt en in publieke discoursen. Ik analyseer zowel de inkadering [*framing*] van de embryo video’s door het

biotechnologiebedrijf Auxogyn als de *time-lapse imaging* systemen zelf als ontstaansvoorwaarde voor deze video's. Binnen de ontwikkeling van een toenemend visuele interface met prenataal leven, zoals de iconische beelden van micro-injectie en foetale echografie, die beide verregaande effecten hebben gehad op de publieke en de private verbeelding van het reproductieve proces, voegen *time-lapse* embryo video's nog een visuele dimensie toe aan de ontmoeting met prenataal leven op het beeldscherm. Daarnaast resulteert de temporalisatie van embryoselectie door de instrumentalisering van embryonale leeftijd ook in nieuwe vormen van "biowaarde" [*biovalue*] (Waldby 2002). Deze methode van embryoselectie resulteert dus niet alleen in meer of minder "IVF succes," maar beïnvloedt ook de conceptualisatie, representatie en commercialisatie van leeftijd op embryonaal niveau.

Na de selectie vervolgt de reis van de eicel—nu embryo—zich in de tweede fase van OC, waarin deze wordt geïmplanteerd in de baarmoeder van de beoogde moeder. Hoofdstuk 6 richt zich op deze fase en onderzoekt hoe de introductie van eicelpreservatie bestaande culturele constructies van "ouder moederschap" zowel volgt als verandert. Het geeft een kritische lezing van de documentaire *Granny's Having a Baby* en de toestemmingsverklaringen die gehanteerd worden bij de procedures voor het invriezen van eicellen. Ik onderscheid drie nieuwe vormen van technologisch-gemedieerd ouder moederschap die verschijnen met OC: tegendraads [*willful*], genetisch gerelateerd en postuum moederschap. Met een analyse van deze vormen van ouder moederschap vraag ik aandacht voor de leeftijdsspecificiteit van de "*reproductive will*" (Ahmed 2014, 112) en de wijze waarop genetische verwantschap herkenbaar wordt in relatie tot maternale leeftijd. Ook bespreek ik de discursieve effecten van de toestemmingsverklaringen m.b.t. de vorming van beoogde verwantschapsbanden en de wijze waarop de leeftijd van de beoogde moeder de categorisering van de eicellen beïnvloedt.

Gegeven het feit dat slechts een beperkt percentage van de ingevroren eicellen resulteert in een levendgeborene, is (ouder) moederschap niet een vanzelfsprekend eindpunt van de reis van de eicel of van deze studie over het invriezen van eicellen. Daarom geeft Hoofdstuk 7 een bredere reflectie op de ruimtelijke trajecten die ingevroren eicellen kunnen afleggen wanneer cryopreservatie de eicel mobiel maakt. Wanneer eicellen ingevroren zijn, worden ze even mobiel als de tanks met vloeibare stikstof waarin ze opgeslagen worden. Het invriezen van eicellen is dus een sleutelconditie voor de ontwikkeling van mondiale stromen van eicellen, die gestuwd worden door de vraag die volgt uit reproductieve en onderzoeksbehoeften in eiceldonatiernetwerken. De Amerikaanse *World Egg Bank*, die ik in dit hoofdstuk bespreek, organiseert wereldwijde verzendingen van bevroren eicellen naar vruchtbaarheidsklinieken. Het biedt daarom een casus voor de bestudering van de implicaties van de transnationale mobiliteit van ingevroren eicellen voor reproductieve eiceldonatie en de hiermee samenhangende reconceptualisaties van reproductieve leeftijd. De mogelijkheid van het verschepen en opslaan van eicellen wordt bovendien

relevant omdat de langverwachte successen in humaan stamcelonderzoek (SCNT) in 2013 de kwestie van eiceldonatie voor onderzoek opnieuw actueel maakten. De eicel neemt een sleutelpositie in binnen een bredere globale biopolitiek van leeftijd door de potentiële klinische toepassingen, financialisering en regulering van stamcelonderzoek en de grote hoeveelheden eicellen—afkomstig van jonge vrouwen—die nodig zijn voor dit onderzoek. Door de beweging van de eicel tussen lichamen en over geopolitieke grenzen, en door diens instrumentalisering in het stoppen, tegengaan of regenereren van leeftijd, transformeert de opkomst van eicelpreservatie op radicale wijze hoe het verstrijken van tijd betekenisvol, zichtbaar en politiek wordt in lichamen en eicellen.

Met deze casussen beargumenteer ik in *Bevroren vruchtbaarheid* dat het invriezen van eicellen een reproductieve technologie is met belangrijke culturele effecten voor de reconceptualisatie en reconfiguratie van de relatie tussen leeftijd en reproductiviteit. Ik schenk aandacht aan de disciplinaire effecten van het anticiperen op leeftijdsgerelateerde onvruchtbaarheid als een vorm van biogereedheid [*biopreparation*], aan de rol van genderspecifieke chrononormativiteit in het vieren of bevragen van eicelpreservatie, aan de culturele specificiteit van het situeren van de oorsprong en eindigheid van het (reproductieve) leven op verschillende punten in de levensloop en aan het leeftijdsspecifieke beroep op vrouwen om hun eicellen in te vriezen, voor zichzelf of voor derden. De visuele interface met prenataal leven in de fotomicrografie van eicellen wordt gebruikt om te reflecteren op de reconfiguratie van reproductieve leeftijd als plastisch en gedistribueerd. *Time-lapse* videos van embryos visualiseren en instrumentaliseren leeftijd op embryonaal niveau op manieren die de verantwoordelijkheid voor embryoselectie redistribueert tussen patiënten, klinieken en bedrijven. Gezien de oprichting van eicelbanken en het ontstaan van mondiale stromen van eicellen, kan het invriezen van eicellen niet langer exclusief gekenmerkt worden als een technologie voor “vruchtbaarheidspreservatie”; het is ook een middel om de infrastructuur voor de uitwisseling van eicellen tussen lichamen en instituten uit te breiden. De 21<sup>e</sup>-eeuwse introductie van het invriezen van eicellen reflecteert een historisch-specifiek moment dat geïnformeerd wordt door zowel een genderspecifieke traditie van het medicaliseren van reproductieve leeftijd en de afwezigheid van verschillende potentiële technologische alternatieven voor vruchtbaarheidspreservatie die momenteel onderzocht worden.

De eicel die na vitrificatie *in vitro* levensvatbaar blijft, belichaamt een complexe relatie tot de genderpolitiek van leeftijd. De mogelijkheid van het invriezen van eicellen bevestigt en verandert chrononormatieve ideeën over wanneer vruchtbaarheid kan worden aangenomen, wanneer onvruchtbaarheid geanticipeerd zou moeten worden, wanneer non-reproductie verandert in uitstel, wanneer vrouwen kinderen zouden moeten krijgen en wie het recht heeft om publiek oordelen te vellen op basis van deze vragen. In de publieke representaties van eicelpreservatie wordt enerzijds met enige regelmaat gesteld dat de bevroren eicel een einde maakt aan de biologische klok, maar anderzijds wordt dit begrip, en de naturaliserende effecten en angstige affecten ervan,

actief geproduceerd en veelvuldig aangehaald. Paradoxaal genoeg brengt de extractie van eicellen hun belichaming onder de aandacht binnen publieke discoursen. Hun bevroren staat maakt hen mobiel op globaal niveau. De eicel, die gezien wordt als de belichaming van nieuw menselijk leven en reproductieve toekomstigheid, is bevroren in een praktijk die ook een confrontatie met eindigheid inhoudt. Deze complexe contrapunten van eicelpreservatie, van vruchtbaarheid en vergankelijkheid, vinden elkaar in de figuur van de eicel. De eicel, bevroren, in leeftijd stilgezet, is een aanknopingspunt geworden voor het vatten van het begin en het einde van het leven, en de sterfelijke tocht die hen verbindt.

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