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Adam Zaretsky

Principal at VASTAL (Vivoarts School for Transgenic Aesthetics Limited), Researcher at NADL inc., Chief Executive Officer at psyFert (the psychic fertility clinic), Founder of BEAK (The Bioart Ethical Advisory Kommission) and proud member of the World Congress on New Reproductive Technology Arts (WCoNRTA)

Transgenic Embryo Implantation Excerpts from *The Life Cycle of The Programmed Mouse,* an Art and Biology Residency in an Experimental Animal Production and Research Facility

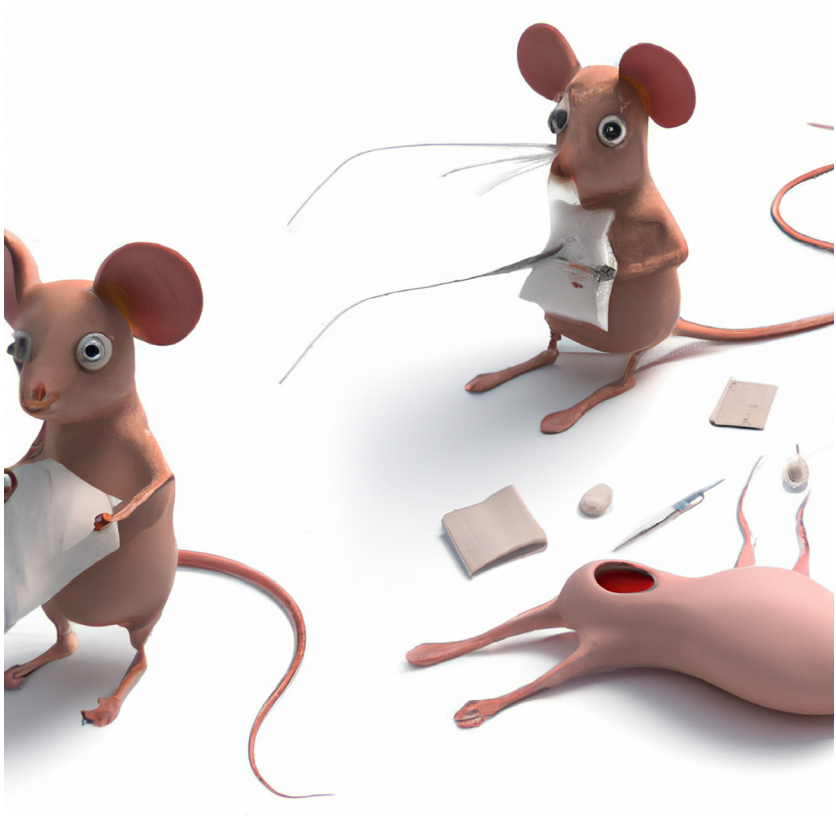

Figure 1.[1] TRANSGENIC EMBRYO IMPLANTATION: Snaking into Foster Female, Pseudo-Pregnant, Donor Mother, Surrogates.

[1] All figures, except nos. 10, 11, 14, and 16 are results of Adam Zaretsky and AI collaboration.

*Author contact information: adam.zaretsky@protonmail.com

Beyond the Barrier

This is an excerpt from a record of a bioart residency in the transgenic mouse production facility at i3S, University Porto, Porto, Portugal, EU 2022: Art/sci research-creation, field notes and bioart from the i3S transgenic mouse production facility. The transgenic mouse production facility at i3S is an animal facility that breeds specific transgenic mutants for lab research. This means that the mice are genetically modified and bred to produce stable litters of similarly mutant pups. In other words, the mice are genetically modified in such a way that their offspring are altered in a specific hereditary and multigenerational way.

Covering the life cycle of the programmed mouse, we asked for hands-on experience as much as possible and learned through doing/witnessing: mouse sperm/egg collection, cryopreservation, fertilization, embryo mutagenic microinjection, implantation of embryos in a pseudopregnant surrogate, embryo dissection for tissue culture, surgery, breeding, and euthanasia. Delving into software studies, there was an exploration of CRISPR/vector design apps and transgenic animal facility management apps. We also accessed global networks for stable pedigree proof of genomic standardization as well as animal care and use in the transgenic core. Learning that the mice were often disease models, created to infect with live contagious diseases or inborn with developmental disabilities (degenerative enhancements), we arranged for some animal enrichment arts. Learning of the often-difficult life of scientists and graduate students, we also took the time to enrich the scientists with an action painting to live music enrichment lab. This form of in depth and experiential research is an advanced version of medical anthropology or science technology studies field working with subjective, literary, informed, morbid, and humorous artistic outcomes.

This Collaboration between Dr. Adam Zaretsky, Dr. Dalila Honorato and Dr. Mónica M. Sousa titled "The Life Cycle of The Programmed Mouse" was an enormous influx of open information that changed my arts process, my writing, and my way of thinking. It is my hope to convey some of what I learned here. I am very thankful for the generosity of my lab and the people who run the facility for their time: sincerity in discussion, allowance for an artist-observer and hands-on training where legally and ethically allowed.

I am focused on the process of transgenic methodologies. I want to understand everything I can about making transgenic organisms. So, this residency was very informative for my grasp of the entire life cycle of the programmed mouse. The animal facility was very open to giving me details and I learned about the flow, the reasoning, the breeding and more.

The i3S Animal Facility provided depth training and hands-on experience with the reproductive technology that goes into the making of transgenic mouse breeds. This included everything it takes to make a novel and stable transgenic mouse line. This included hormoness for hyperovulation, primary acquisitions and cryopreservation of sperm, ova, and fertilization and microinjection of germline transgenes as well

as embryo implantatiion into pseudopregnant, surrogate, donor mothers. We explored varied topics: the pharma pipeline, Off-Target Mutations, COVID vaccines, biosafety, enrichment, bioinformatics databases, biobanking, Behavioral Testing, tissue culture of embryonic stem cells, Neural Regeneration, software for mutant design, Animal Facility Management Software, Caretakers, Quarantine, Vivisection, and euthanasia.

Late in my 6 weeks residency, I gained access to the ABSL-3, (biological containment level 3 area) of the Animal Facility. This area is usually for animal caretakers only. Entry is called "Beyond the Barrier" as you are meant to dispose of your everyday clothing and objects, bathe and wear sterile disposable clothing. I was not allowed to bring my cell phone, a camera, my notepad or a pen. I left all that with my wallet, my wedding ring, and my keys with my clothing in a locker. These barrier access rooms are like an airlock. Most of the cleanliness is to protect the animals from contamination by people. Not only are there surgeries being done and recoveries in process, but some of the mice are immunodeficient, sick in other ways and/or in delicate transgenic model trails that involve cures not yet tested.

Some of the aseptic protections are for the animals' safety and resemble any doctor or nurse's prep for surgery in any hospital in the world. But some of the ritual cleansing is also to ensure experimental repeatability by reducing variability. In this case, it is the human body's surface microbiome that is the potential for loose skewing of the experimental data locus, self-quarantine to protect others and other's data. I showered and washed my hands all the way to the elbows three times. I then put on the special pants, socks, bootie shoes, shirt, hairnet, mask and gloves. I sprayed my id card and gloves with alcohol. Then I entered The Barrier.

Figure 2. Hormone injected pseudo-pregnant mice are given anesthesia for an operation. This is also called vivisection. Foster Female mice are opened up and the embryos are injected with a hypodermic needle into their uterus, actually into one of

their dual uterine horns. The embryos are implanted into a surrogate mother mouse. The donor uterine horn allows for mutant implantation into the wall of the uterus to further the gestation. Mouse embryo implantation is done after the fertilization and the grading of embryos, after the microinjection of the transgene construct or the CRISPR guide, usually after cryopreservation and thawing of the developing transgenic embryos. See: mouse IVF, Microinjection and Cryopreservation chapters at: https://ectopialab.org/category/copraxis-adam-dalila-monica/

Surgeon, Nurse, Anesthesiologist

M. was there to greet me and walk me down the hall to the operation room. Surgery is vivisection. I say this quite simply, but it is no simple issue for some. I was surprised to come to terms with this surgery so well. It is perhaps the details that make the difference. The surgery is familiar as it is much like a human surgery. I was very impressed with the skill set, the craft of the process and the care involved. The process was done in a way that was as pain free as possible, elegantly procedural in pace (neither rushed nor dawdling) and with an immense knowledge set calmly applied. Mid-surgery I turned to M. and said, "you are a surgeon and an anesthesiologist all at once". She said yes and added that she was a nurse to her mice as well.

Figure 3. The Pseudo-Pregnant Surrogate mouse is entered into a clear plexiglass gas chamber and given a general anesthesia. Then the mouse is removed and put onto a sterile surgical field. The sterile surgical field is also a heating pad, so the mouse is warm and cozy during surgery. A face mask is attached to the nose and mouth area of the donor mother to continue general anesthesia. Eye drops are applied to keep the Foster Female from having dry eye as the ability to blink is lost in the anesthetized state.

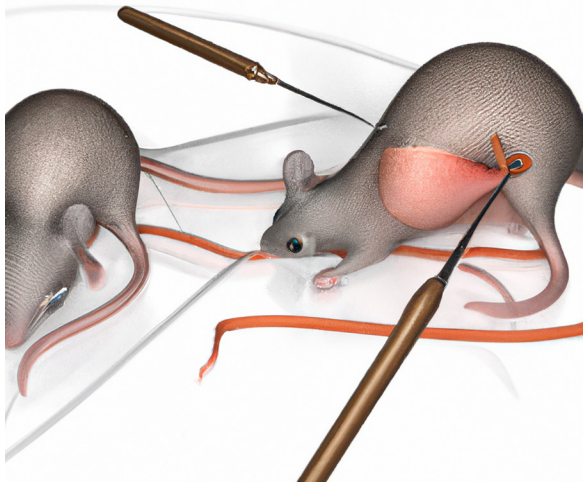

Figure 4. A rectangular area on the side of the mouse between the ribs and the thigh is shaved. I literally watched the shaving done. This is from memory. No notebooks, no photos. It was a disposable razor. M. was very tidy with the hair. The area is then washed and wiped with alcohol and then washed and wiped again with betadine. The area is now prepared for incision. The next step is a subcutaneous (under the skin) injection with a painkiller like Novocaine... ensuring complete numbness of the area. While the analgesic takes effect, the hypodermic needle is loaded with mouse embryos.

Figure 5. DALL·E, still from "The Life Cycle of the Programmed Mouse", CopraxiS, Ectopia, Institute for Research and Innovation in Health of the University of Porto (i3S) https://ectopialab.org/category/copraxis-adam-dalila-monica/, part of the

exhibition "La Promesa de la Justicia Mutiespecie" [The Promise of Multispecies Justice] as a part of 4S (Society for the Social Studies of Science curated Eben Kirksey, ESOCITE https://4sonline.org/4s_2022_cholula.php, December 2022, Chalula and Miguel Hildalgo, Chiapas, Mexico as well as exhibition: "Species of Justice", School of Anthropology and Museum Ethnography, University of Oxford, UK; https://multispeciesjustice.space/oxford-art-exhibition/

Review of *The Snake* by John Steinbeck

There is a short story titled *The Snake* by John Steinbeck; a recording of it, from 1937, can be found online for streaming only, link below. I had the feeling I was re-enacting the story in the lab with the scientist, but the gender roles were partially reversed, and I wasn't sure who was haunting who. The story tells about a young scientist who works collecting, killing, and selling specimens and organism by-products in a little independent laboratory on the ocean next to the Monterey Bay sardine canneries of Northern California. From starfish embryology to rattlesnake venom to embalmed cats, to mounted octopi, he is a scientist dealing in death and anatomy, reproduction and dissection. There is euthanasia and feeding, fresh death and timed stages of developing new life.

The story is about a woman who comes to his lab to observe. She is chilling to him in her quiet interest in his male rattlesnake. She seems to be a snake woman and she makes a haunted request. She wants to buy the male rattlesnake and leave him in the lab but occasionally come to look at him or feed him. And she wants to feed the snake a live rat as part of the purchase and see the snake strike the rat with venom and then be swallowed whole.

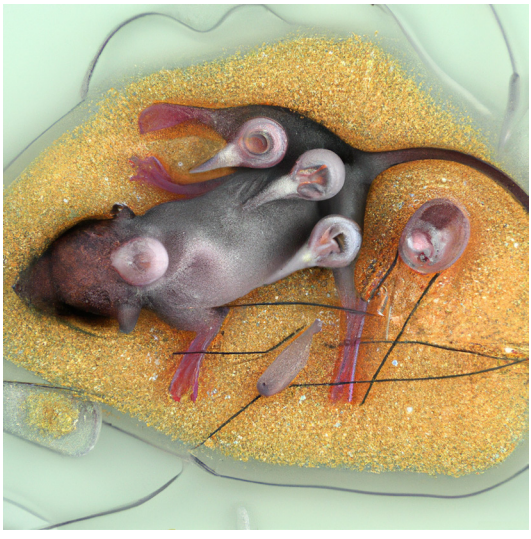

Figure 6. "She is chilling to him in her quiet interest in his male rattlesnake."

The woman's request, her dark eyes, her seeming cold bloodedness and her emulation of the snake's moves makes the young male scientist afraid. He feels like she has paid him as a sort of pimp to negotiate an uncanny relation between a non-scientist human and a process that should not be read as a sadistic sport or an aberrant circus of thrill killing. Nonetheless, he accepts the money and puts the snake and the rat together in a tank. The scientist tries to cover the feeling of being part of the show, the feeling of being included in some deep wrongness, some sick infinity that makes him flush with rising blood in the face and feel the snake, like a surgeon, has no aberrant mourning, the woman like the snake is not interested in his teaching, explaining, detailing. The shielding falls away and the everyday becomes transgressive.

Figure 7. She seems to be a snake woman and she makes a haunted request… He avoids her eyes, he avoids looking at her mouth while the snake and the woman weave their heads back and forth.

The snake strikes and kisses the corpse and then swallows the rat whole with a jaw, throat, jaw, throat rhythm. The sexual innuendo of the cold blooded yet unscientific woman outsider is not lost on the young scientist. She never comes to visit again, and her disappearance becomes a sort of never-ending obsession for her return, to meet her in the street, to look for her everywhere and see her sometimes as an apparition, to see her in others, misidentified, to see her on the wind.[2]

[2] *The Snake* by John Steinbeck, read by the author, original audio file from a reel to reel tape, recorded in 1937, Salinas Public Library, Salinas, California, USA, North America, Online, Stream only: https://archive.org/details/csal_000048, acc. September 5, 2023

Re-enacting *The Snake* by John Steinbeck

In this case it was a visiting artist with prurient interests visiting as a non-scientist to the surgical field. Observing but not allowed to touch, the IVF implantation of mutant embryos into a psuedo-pregnant mouse mother is witnessed by the bioartist in residence.

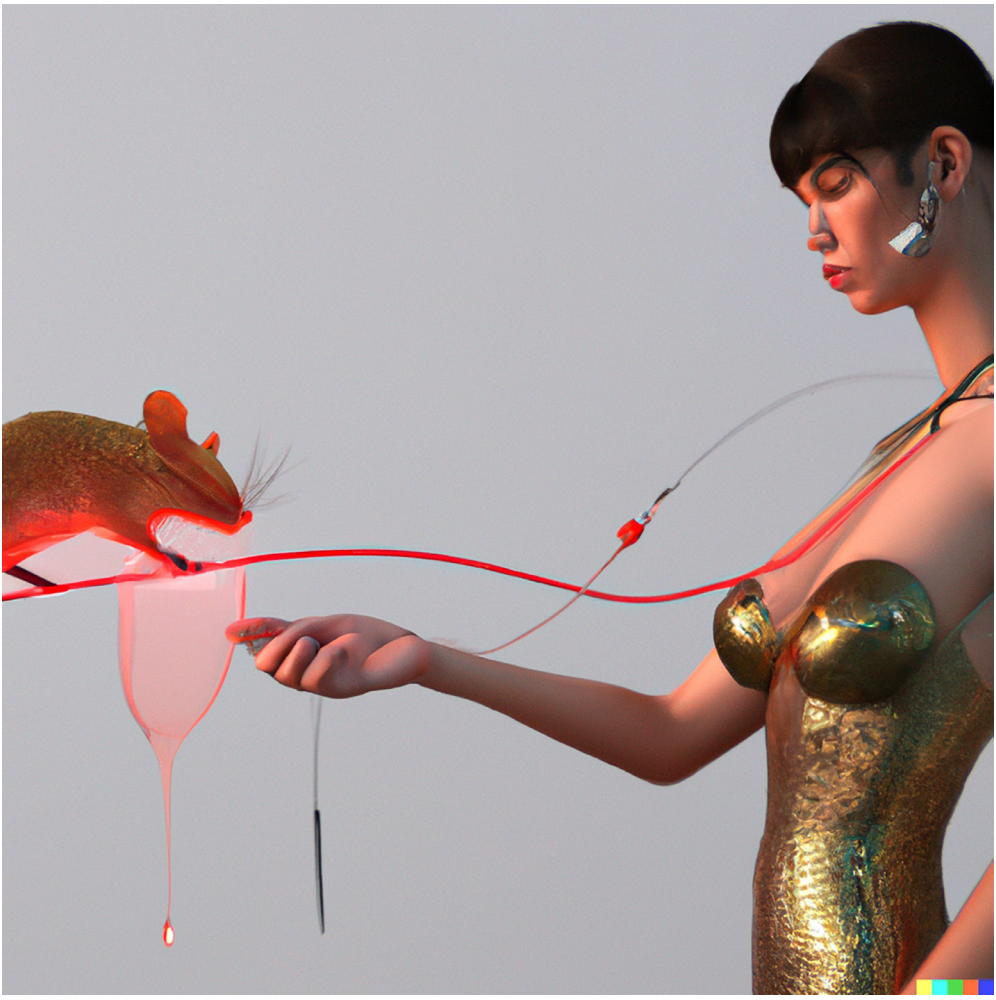

Figure 8. is evidence by the artist of the ability to handle, to prove partial desensitization to: euthanasia, performing fresh dead dissection, engaging the process of fresh dead cesarean section, executing transgenic embryo dissection and primary embryo 'parts' acquisition for tissue culture and organoid culturing... i.e. neural ganglia... etc.

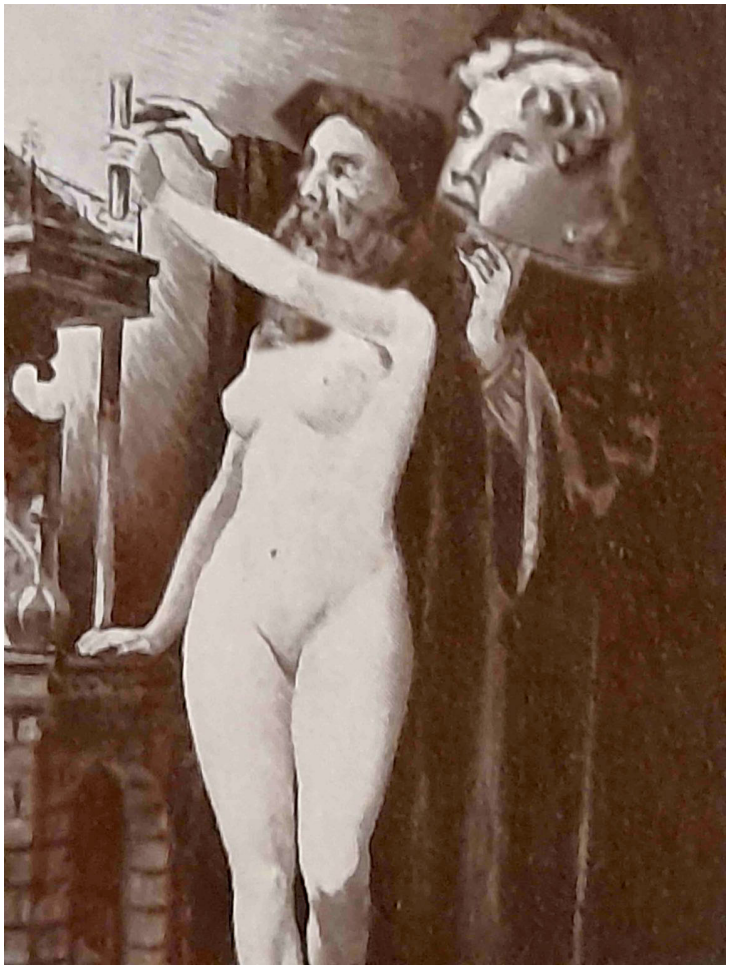

Figure 9. Gender Play in the Technical-Alchemical Passage of Real Methodologies, Apprentice. Here the psychosexual symbolic is not just about killing and eating but also about mating and breeding and hauntology. And I am the woman visiting the scientist in the re-enactment of the story.

Gore's Anatomy: The Untrained Eye and the Illegibility of the Visceral

The procedure was done by M., a lovely scientist. Both M. and I are engaged as spooky interlopers. Like in the short story, *The Snake*, I was the obscure witness, and I was sometimes looking at M. not the mouse, as she made the first incision through the skin and the second incision through the muscle.

Finally, I am invited to observe mouse IVF embryo Implantation and it is the gaping maw of the inside of a body, all viscera, no structure. I am struck blind; my eye

is not trained to see the specialized anatomy in the biomass. M. finds the ovary with a tweezer and clamps the ovary and tapes the clamp to the sterile field. Stay in place. This holds the incision open, and she turns to me.

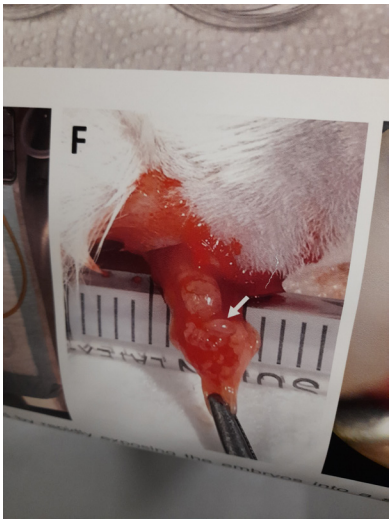

Figure 10. M found the ovary and the ampule and the uterine horn. She showed me, but my untrained eye could only see gore. I could not see what she saw, even as she dabbed blood away with a piece of gauze. Photo credit: Adam Zaretsky

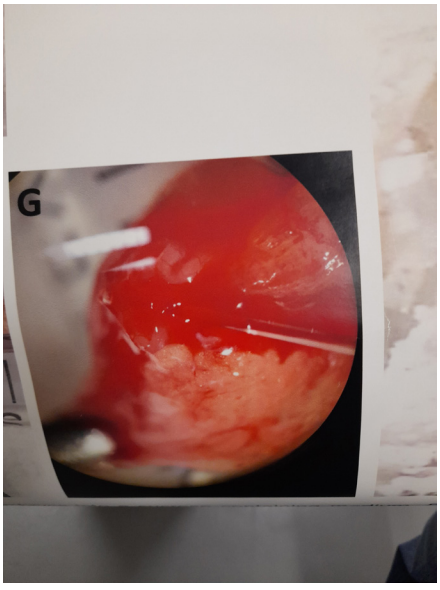

Figure 11. I could not see any anatomical forms. My mind made out only abstract red enigma. Photo credit: Adam Zaretsky

Hands-On, Hands-Off, and somethings in-between

I had been in similar situations like this, all dolled up as a research surgeon or euthanasiatrix and not allowed to help ... all gloved up and nowhere to go. No hands-on vivisection is allowed by law without a license. It's not happening without the proper training and the right reasons. I had asked to be allowed to assist in any legal way possible during the process. So, when M. asked me to go to the cabinet and bring her a hypodermic syringe for embryo loading and injection, I was pleased to have a role.

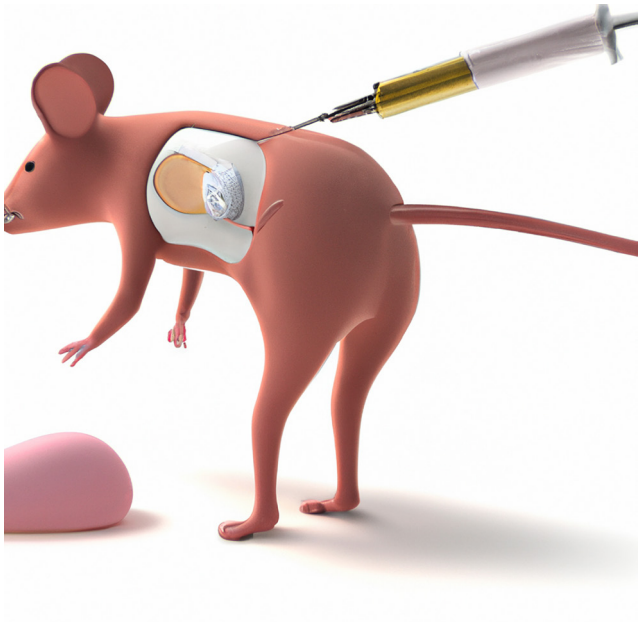

Figure 12. "So, when M. asked me to go to the cabinet and bring her a hypodermic syringe for embryo loading and injection, I was pleased to have a role." 4D render of a mouse under anesthesia and then shaved in a rectangle on her body and then surgery opens her, and the transgenic embryos are injected in.

I returned to M. with the hypo and passed it to her. This was my hands-on moment. She is mouth pipetting the transgenic mouse embryos, sucking into a glass needle under the microscope. I stand behind her left shoulder; she is sitting, I am standing. The silence is deafening.

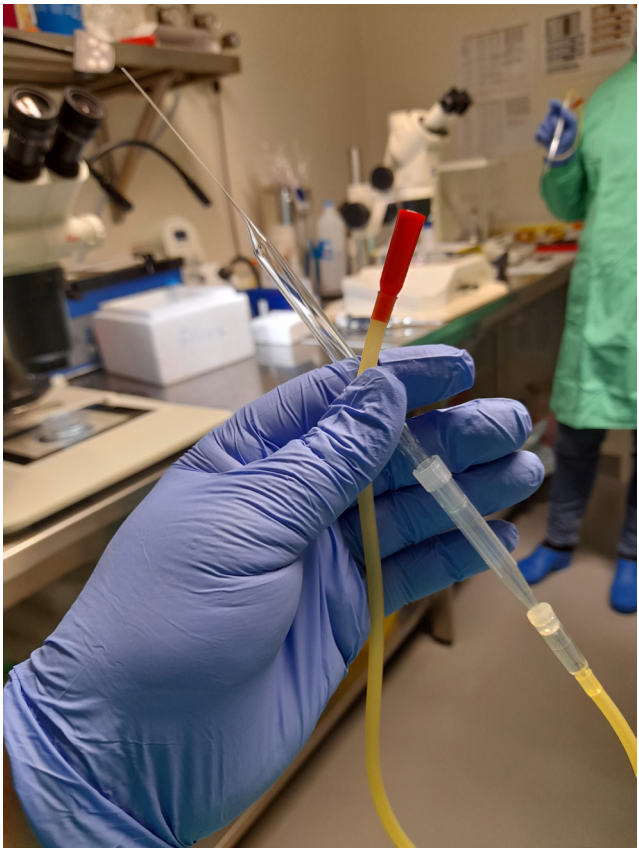

Figure 13. Anonymous Documentation of Mouth Pipette, Handcrafted in the Lab. The keepers and the caretakers and the artist, beyond The Barrier, exposing the ovary, finding the ampule or, in humans, the fallopian tube, snipping it, taking the loaded glass needle of the mouth pipette that is now filled with 10-12 mutant germline mouse embryos living and mouth pipetting them, blowing them into the needle of the hypodermic needle, injecting the embryos into the ampula.

And there is M. again with the super crafty, specialized skills, suturing ornate tiny stitches, microfine suturing of the muscle, and then again taking the time to do it right, tweezers and suturing needles and nearly invisible threads to close the exterior skin. After the wound is closed twice, a third level of containment of the wound involves a sort of glue that is added to the sutured wound and sealed closed. This is to prevent the mice from scratching at the wound and tearing open the stitches. This to me implies that there is a skill set, a working knowledge of the organism, the animal is known, metabolically, behaviorally, intimately.

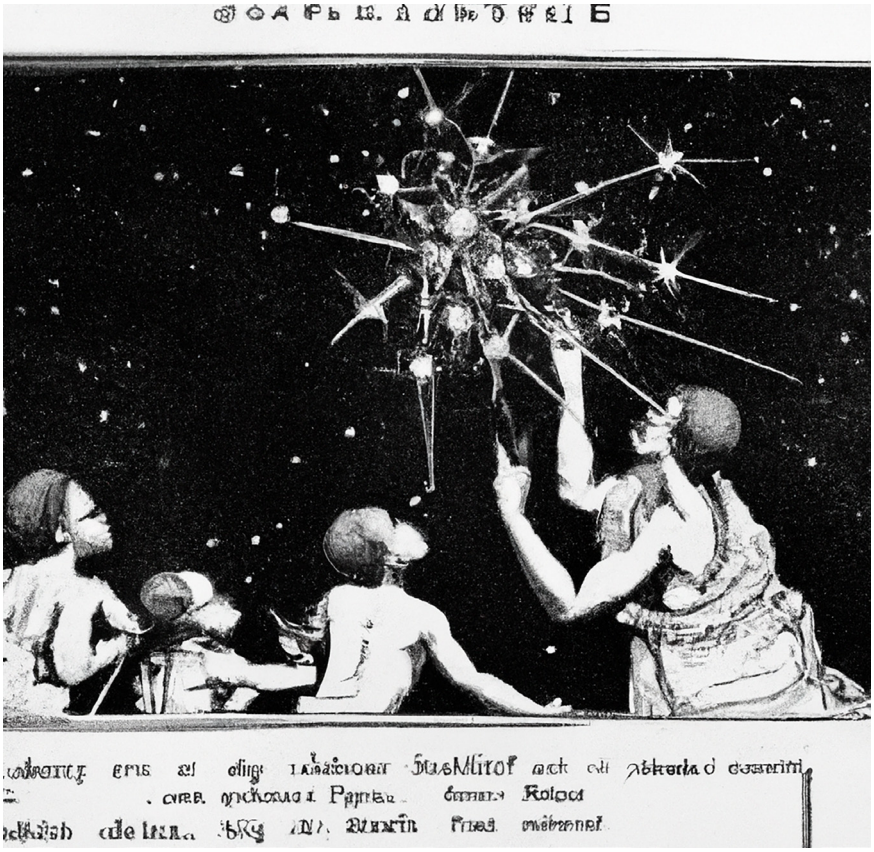

Figure 14. Then my father died, lithograph of seven sisters (Seraphim/Sefirot) lifting the terminal father into the Pleiades star cluster. Credit: Adam Zaretsky

The Mouse will heal, hold these embryos and either birth them as new strains or be euthanized and have them taken for regenerative embryo work. It is now time to turn off the anesthesia. M. turns to me and asks, would I like to turn off the gas. It is non-invasive and I suppose it is a kind act but I am really willing to do whatever she will accept, hungry for engagement, to follow her rules on or off protocol. I turn off the gas and the Mouse, the Surrogate Womb Female, Pseudo-Donor Mother, now pregnant with a brood of another's product-oriented kin, she begins to awaken from amnesia. Seemingly drunk, silly with some sort of hungry celebratory body language, she eats and drinks and explores her housing with newfound relish... as with many near death experiences… awakening from amnesia is akin to anamnesis and so a feeling of overarching comprehension can ensue.

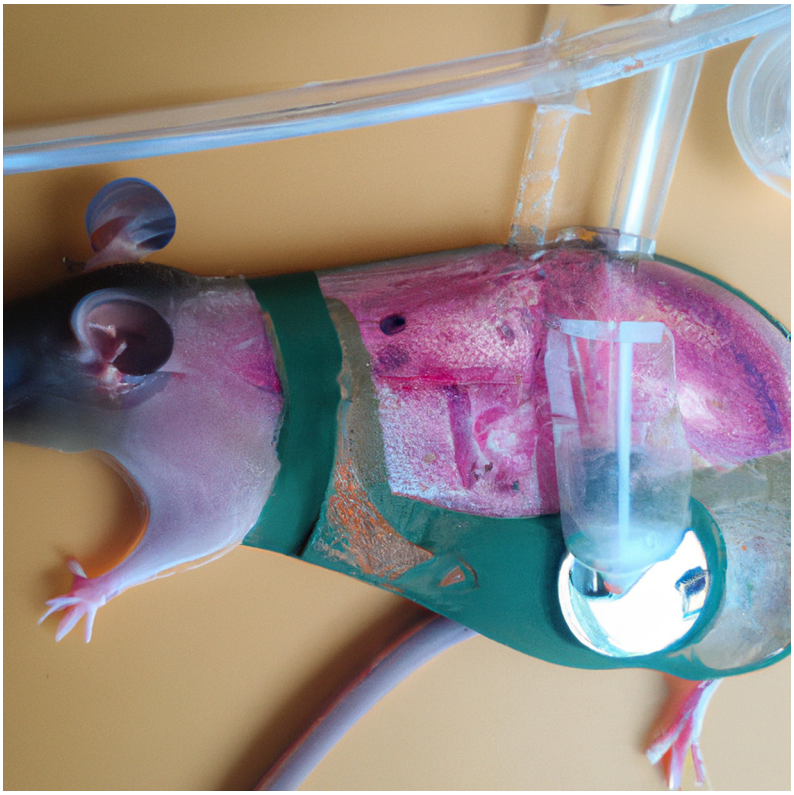

Figure 15. The keepers and the caretakers and the artist, beyond The Barrier, exposing the ovary, finding the ampula or, in humans, the fallopian tube, snipping it, taking the loaded glass needle of the mouth pipette that is now filled with 10-12 living mutant germline mouse embryos and mouth pipetting them, blowing them through the needle of the hypodermic, injecting the embryos into the ampula.

Aftercare

We check on the grimace scale and our mom with our baby pups is recovering from surgery well. That evening there is a mating. Newly implanted Pseudo-Pregnant Donor Surrogates need to mate for the proper swelling of the ampula and the uterine horn's receptivity to be high efficiency. So, she is mated with a sterile male... vasectomized or with the testes removed. The male must be sterile to ensure all the babies are for the company not from some willy-nilly hanky-panky. But the mating act, though not reproductive, must occur to stimulate the body, to fool it into swallowing the human-techno repro-parenting detour. And I leave out The Barrier, sending my sterile personal protective clothing for lab laundry for incineration.

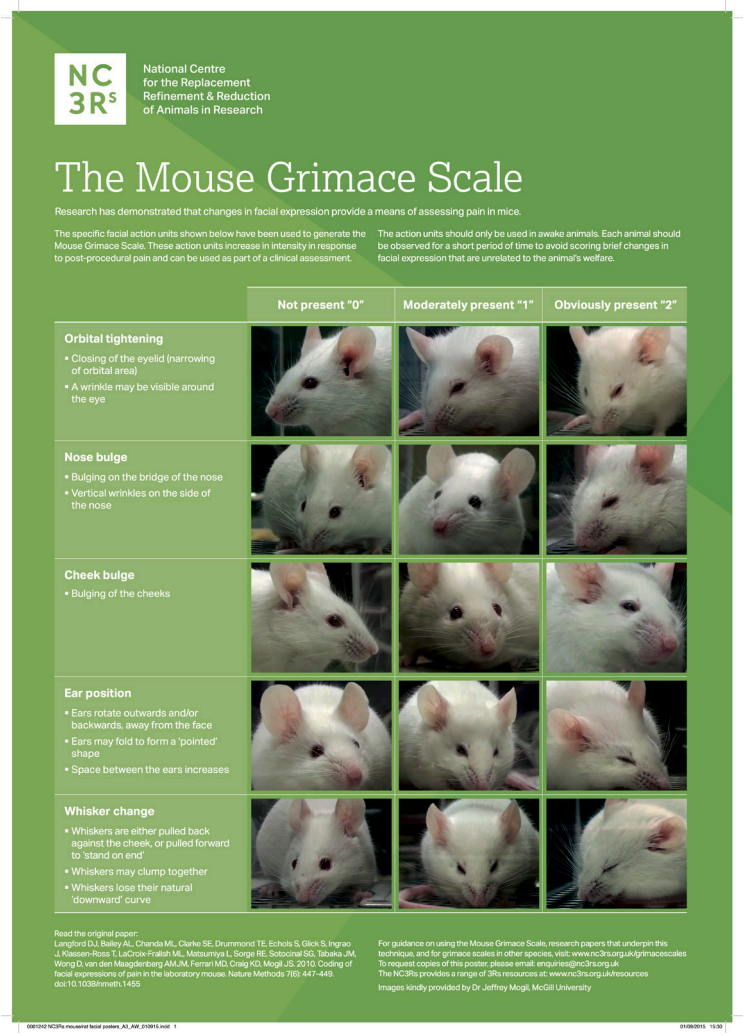

Figure 16. Knowledge of your organism comes with time and study. Knowing how to read pain in the faces of your scientific laboratory animals is imperative. The Mouse Grimace Scale features specific facial action units, increasing in intensity in response to post-procedural pain. The poster was prominently displayed in the i3S animal facility. A poster version in multiple languages is downloadable, see: NC3Rs, National Centre for the Replacement, Refinement and Reduction of Animals in Research, The Mouse Grimace Scale, https://www.nc3rs.org.uk/3rs-resources/grimace-scales/grimace-scale-mouse. Original paper: Langford DJ et al., "Coding of facial expressions of pain in the laboratory mouse," *Nature Methods* 7, 6 (2010): 447–449. doi:10.1038/nmeth.1455

Figure 17. Here is the AI version of the face of the virtual mouse for comparison. "After the wound is closed twice, a third level of containment of the wound involves a sort of glue that is added to the sutured wound and sealed closed. This is to prevent the mice from scratching at the wound and tearing open the stitches. This to me implies that there is a skill set, a working knowledge of the organism, the animal is known, metabolically, behaviorally, intimately."

An Aside on LGTBQ+ use of Foster Female, Pseudo-Pregnant Donor Mother, Surrogates?

There is no nuanced talk or practice of understanding sex and gender of non-humans in a reproductive animal facility. There are only males and females. You are either fertile or you are dead. There is use of mice that have been given vasectomies, but they are used as reproductive tools to stimulate ovulation or embryo implantation. On the other hand, the instrumentalization of fertility has an obscure commonality (for different purposes and identities) as some of the same hormones utilized by the trans-community are used in reproductive technology and the goal of making mutants is also about difference production.

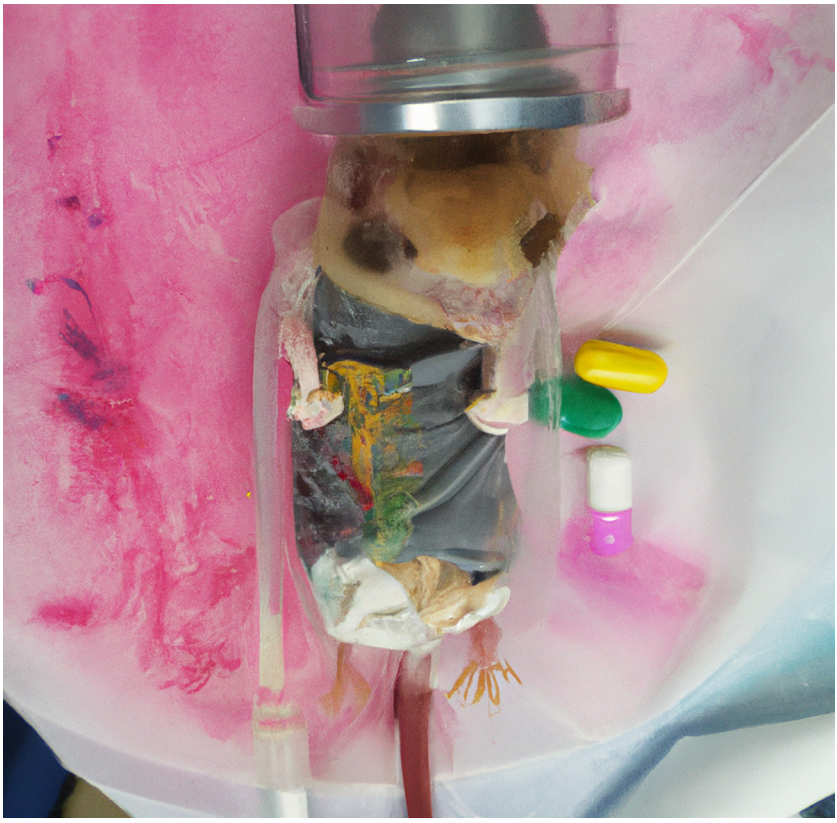

Figure 18. This commonality, and the fundamentally queer process of mechanizing reproduction outside of a gendered body, opens up ways that trans-people of the breeder curious variety can get some traction in the IVF community. Many IVF clinics are LGTBQ+ friendly.

The commercialization of baby production and the blind reproductive frenzy produced by Fertility Clinics can be both an abuse of authority and a queer friendly space equal identity opportunity, if children are your goal. Of course the use of mostly cis and often economically underprivileged, predominantly cis women's bodies, often international women of color, as non-mouse, semi-humanized surrogates in a competitive womb implantation market makes for unusually harsh usury that belies any intersectionality and just makes babies for straight, gay, bisexual or group marriage couples who, if they don't want to be bothered to carry or are not born to it, can outsource the embodied dangers, pain, and labor to others. Surrogate mothers are left with few rights to their offspring, even though, through the placenta, the blood of the birth mother and the fetal blood cells are entangled at best if not a permanent part of each organism for the lifetime or even congenitally in both directions.

AI – Artificial Infantilism: Photos Blocked but DALL-E reaction is also censored ...

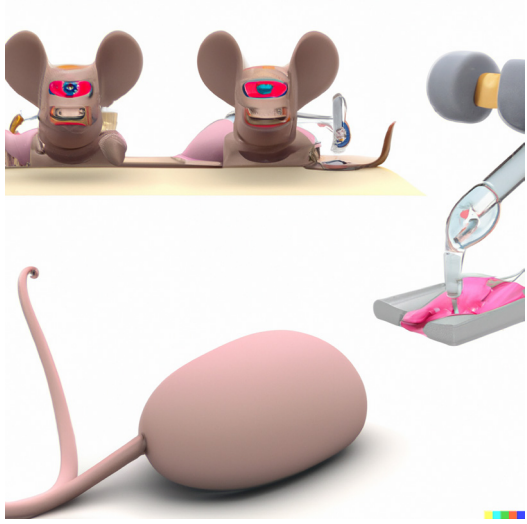

Figure 19. Andi Wallwhore + DALL-E, "The urge for profit seems to equate to a maturity break."

I was not allowed to take pictures or even bring a camera beyond The Barrier. So, I generated some imagery collaborating with the proprietary AI system Dall-E. I thought Dall-E representation might be a stand-in for potentially PR unfriendly documentation. But the Dall-E system is also Rated G (G is for General all ages audience).

Figure 20. Prompt – Foster Female MOUSE, Pseudo-Pregnant, Donor Mother, Surrogate MICROINJECTION EMBROLOGY, Beware the military, industrial, media complex's 'no nipples' platform immaturity engines.

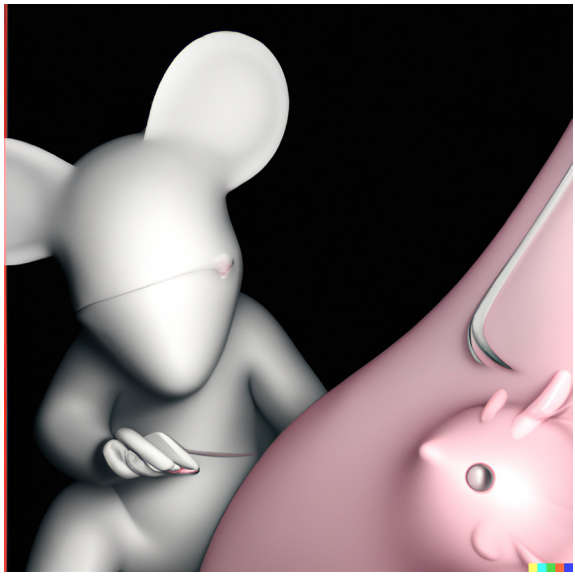

Figure 21. "No violence, politics, or sex is allowed. No nudity. Safety and harm reduction is equated with a devolved version of the definition of safety. We are at the point of stopping racism, sexism, homophobia, and capitalist greed by simply allowing our platforms to erase all controversy in words, images and video clips. The trouble is not gone, it is censored to the point of Artificial Infantilism (AI)."

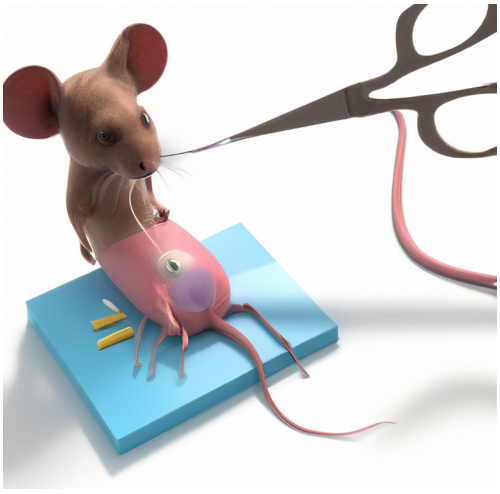

Figure 22. "Being overly conservative to 'protect the children' is a standard PR ploy offering generic happy alignments and assuming the emotional landscape of most users is 12 years old and under. This super stoopid version of safety where non-G-rated AI is not happening may set humanity in all its biodiversity and behavioral integrity into a biased downward spiral against adulthood."

It is time to worry about more than AI and Privacy. The future of human cognitive maturity is at stake. The urge for profit seems to equate to a maturity break. Unless you are actively consuming or producing porn, it is currently a public relations nightmare to expose potential clients to anything except a '12 years old or under' media platform. The urge for profit seems to equate to a maturity break. Being overly conservative to 'protect the children' is a standard PR ploy offering generic happy alignments and assuming the emotional landscape of most users is 12 years old and under. This super stoopid version of safety where non-G-rated AI is not happening may set humanity in all its biodiversity and behavioral integrity into a biased downward spiral against adulthood. No violence, politics, or sex is allowed. No nudity. Safety and harm reduction is equated with a devolved version of the definition of safety. We are at the point of stopping racism, sexism, homophobia, and capitalist greed by simply allowing our platforms to erase all controversy in words, images, and video clips. The trouble is not gone, it is censored to the point of Artificial Infantilism (AI).

Credits

Excerpts from a TRANSGENIC EMBRYO IMPLANTATION: Snaking into Foster Female, Pseudo-Pregnant, Donor Mother, Surrogates, excerpted from THE LIFE CYCLE OF THE PROGRAMMED MOUSE, an Art and Biology Collaboration by Dr. Adam Zaretsky, Dr. Dalila Honorato, and Dr. Mónica M. Sousa, Art/sci research-creation field notes and bioart from the i3S transgenic mouse production facility at i3S, University Porto, Porto, Portugal, EU 2022.

The residency was in the transgenic mouse production facility and Nerve Regeneration Lab at the Instituto de Investigação e Inovação em Saúde (i3S), University Porto, Porto, Portugal, EU Organized by CopraxiS Porto, Portugal: Maria Manuela Lopes (i3s) and Julio Borlido Santos (i3s) conjunction with Marta de Menezes of Ectopia in Lisbon, Portugal with generous support from HAL.

The transgenic mouse production facility at i3S is an animal facility that breeds specific transgenic mutants for lab research. This means that the mice are genetically modified and bred to produce stable litters of similarly mutant pups. In other words, the mice are genetically modified in such a way that their offspring are altered in a specific hereditary and multigenerational way. The i3S Animal Facility provided depth training and hands-on experience with the reproductive technology that goes into the making of transgenic mouse breeds. This included everything it takes to make a novel and stable transgenic mouse line. This included hormoness for hyperovulation, primary acquisitions and cryopreservation of sperm, ova, and fertilization and microinjection of germline transgenes as well as embryo implantation into pseudopregnant, surrogate, donor mothers. We explored varied topics: the pharma pipeline, Off-Target Mutations, COVID vaccines, biosafety, enrichment, bioinformatics databases, biobanking, Behavioral Testing, tissue culture of embryonic stem cells, Neural Regeneration, software for mutant design, Animal Facility Management Software, Caretakers, Quarantine, Vivisection, and Euthanasia. Full text, images, and videos here: https://ectopialab.org/category/copraxis-adam-dalila-monica/

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