

October 2020

Commoning Molecules: Decolonising Biological Patents by Gender Hacking Protocols

Maddalena Fragnito

Follow this and additional works at: <https://vc.bridgew.edu/jiws>



Part of the [Women's Studies Commons](#)

Recommended Citation

Fragnito, Maddalena (2020). Commoning Molecules: Decolonising Biological Patents by Gender Hacking Protocols. *Journal of International Women's Studies*, 21(7), 153-169.
Available at: <https://vc.bridgew.edu/jiws/vol21/iss7/12>

This item is available as part of Virtual Commons, the open-access institutional repository of Bridgewater State University, Bridgewater, Massachusetts.

Commoning Molecules: Decolonising Biological Patents by Gender Hacking Protocols

By Maddalena Fragnito¹

Abstract

By making reference to the political context of “molecular invasion” (Critical Art Ensemble 2002), this article will compare two practices of production and administration of hormones to highlight the consequences at stake when business property extends over bodies and cells of humans, animals and plants.

On the one hand, I will examine DIWO (Do It With Others) biohacking workshops that synthesise pharmaceutical hormones and share the know-how by using *open-source* protocols and participatory workshop methods. I will refer to these specific practices as exemplary of a growing approach to the topic which represents a new field combining biohacking, activism, art, and open science, by “commoning” (Linebaugh 2008) medical tools and knowledge. These workshops are hacking the business property in humans by commoning practices of co-creating and co-producing hormone molecules, refusing to be locked into the profit-driven mechanics of bio-capital and aiming at taking back scientific knowledge. Moreover, these interventions question what a *normal* or *natural* model of sex is – given that organic pollutants are already affecting every aspect of the sphere of reproduction of humans and animals, its related organs and hormonal balance (SCOPE-IUPAC 2001; Lind and Lind 2011; Hood 2005; Kier 2010; Langstone 2010).

On the other hand, I draw on an open-ended conversation I conducted with a number of Italian trans activists, focusing on the power that pharmaceutical monopolies have, through the intellectual property rights on pharmaceuticals (including hormones), to introduce or withdraw from the market drugs on which many people rely.

This article aims to show how selected DIWO biohacking workshops, which are taking place between Europe and North America, can be understood as decolonial interventions as they call us to critically reappraise the relationship between knowledge, power, and institutions by commoning science knowledge and resisting the push to commodify knowledge and place it behind paywalls, by commoning the molecules’ production. Finally, they promote a more inclusive approach to healthcare that critically reappraises technology and raises collective awareness of our bodies as battlegrounds to be engineered and controlled.

Keywords: Biopolitics, Commoning, DIWO, Hormones, Transgender Healthcare, decoloniality

Introduction

This article highlights the contradiction existing between the framing of endocrine pollution on the environment – which is known to alter reproduction and sexual morphology in human and animal organisms (SCOPE-IUPAC 2001; Lind and Lind 2011; Hood 2005; Kier

¹ Maddalena Fragnito is a cultural activist exploring the intersections among art, transfeminisms, critical theory and technologies – focusing on practices of commoning social reproduction. At the moment she is a Doctoral Student at Coventry University’s Centre for Postdigital Cultures.

2010; Langstone 2010) – and the restricted access to hormonal therapies for the self-determination of transgender people’s sexual identity. As a counterpoint, I look at DIWO biohacking workshops which are promoting the dissemination of open-source sex hormone treatment protocols for/with people who want/need it; and draw on an open-ended conversation² I conducted with a number of Italian transgender activists, focusing on the access to hormonal therapies.

The selected participatory workshop practices, by hacking the property system which stands behind hormones’ molecular patents and by a common re/appropriation of scientific and chemical knowledge, offer critique and resistance against neo-colonialist resource plunder by the bio-capital market system, the effects of which can be traced in human and animal bodies. Moreover, this embodied perspective reframes ‘toxicity’. Indeed, a focus on biohacking activism and DIWO workshops serves to question the contradictions between two frames: the toxicity of hormone pollution (seen in terms of the acceptable) and the inaccessibility of hormones for gender re/balancing (seen in terms of the unacceptable). Finally, they speculate on more autonomous collaborative infrastructures run using open-source protocols and participatory workshop methods.

Drawing on Critical Art Ensemble (2002), Giovanna Di Chiro (2010), Malin Ah-King and Eva Hayward (2013), Alessandro Delfanti (2013), Mary Maggic (2015), Power Makes us Sick (2018); and an open-ended conversation with Italian transgender activists engaged in struggles around the access to hormonal therapies, this article will: 1) trace some popular discourses around the effects of endocrine disruption through normative assumptions about sex and sexuality; 2) describe participatory workshop practices that challenge market rules for hormones by redistributing scientific knowledge and commoning molecules’ production and finally, 3) analyse boundaries and overlaps across the patents regulatory system, open science and DIWO biohacking healthcare workshops through the lens of the technologies in use, to open up the relationship between knowledge, power and institutions that they represent.

The Accepted and the Non-acceptable

We are all, deep down, transsexuals, we have all been transsexual infants, and we have been forced to identify with a specific monosexual role, masculine or feminine. (Mario Mieli 1977)

The “harmful effect of material culture on the environment” (Ah-King and Hayward 2013:1) altering reproduction and sexual morphology in human and animal organisms, has been well documented during the last decades. For instance, the SCOPE-IUPAC report (2001) says that environmental endocrine pollution can be expected in all animals, including humans, whose hormones initiate physical change. Many agents are producing the unintended effects through pollution: steroid artificial hormones, such as progestins and Ethinyl estradiol, which have been used as hormonal contraceptives for birth control during last 50 years (Pletzer and Kerschbaum 2014); anti-inflammatory cortisol, hormonal replacement treatments for menopause symptoms and muscle enhancement. There are also other pollutants that cause endocrine disruption, such as

² The public roundtable “Transizioni e accesso alle cure” (Transitioning and Access to Healthcare) was held in MACAO, an autonomous cultural centre in Milan, on October 6, 2019. <http://www.macaomilano.org/spip.php?article946>

Bisphenol A (BPA) found in plastic bottles, containers, food tins, paper receipts, and more. Farming biocides that pollute soil and water like ATRAZINE which is found in 94% of drinkable American water according to a study conducted by USDA (see Pesticide Data Program); PCBs considered to be detectable in all living bodies of the planet (ATSDR 2014); and, finally, DDT which was banned in industrial countries for its health effects, but not in many developing countries (Stockholm Convention on Persistent Organic Pollutants 2001).

In 2002, the Critical Art Ensemble³ (formed in 1987 by five tactical media practitioners) organized a participatory science-theater work held in cooperation with students from the Corcoran School of Art and Design. The “Molecular Invasion” work aims to establish a model for contestational biology. Indeed, the Critical Art Ensemble (CAE) response to the “ultimately unsolvable problems” (2002) caused by bio-capital profiteering is the idea of “fuzzy biological sabotage”, a collective practice that sets on the ambiguous line between the legal and the illegal from the perspective of property law.

Acting within the areas that have not yet been fully regulated allows the molecular invasion to be answered through a chain of counter-events of biological sabotage. Within a collective practice, such as CAE's work, the molecular invasion altering organisms’ hormonal balance already begs the question of what is *normal* and *natural*, given that organic pollutants are already affecting our bodies, and how to think about bodily awareness and intimate relationships with the surrounding environment.

On the one hand, the endless negotiation around what (and to whom) is accepted as *natural* and what (and to whom) is not-acceptable because it is considered *unnatural*, informs cultural structures and dynamics at play, defining the relationship between purity and toxicity. In fact, the social organisation of the normative, places purity at the top of the scale of cultural value and toxicity or pollution at the bottom. Into this binary moral order, humans are discouraged from claiming full purity but, simultaneously, some elements of the unclean, polluted and toxic are strictly taboo (Douglas 1966). On the other hand, artist Mary Maggic’s question “Why is it normal for capitalism to poison our bodies with xenoestrogens without our consent, but trans bodies who want to choose estrogen are policed every step of the way?” (2019) is crucial to this text when raising the inquiry of the accepted versus the unacceptable.

These contradictions show how, during the last decades, our understanding of – and reaction to – hormone-disrupting pollution have been guided by contradictory framings which tend to emphasise some aspects of such pollution while dismissing others. This framing becomes evident when, for instance, in western cultures, transgender people are *unacceptable* since they are considered culturally unnatural and polluting (therefore haunting common sense and its normative organisation); and, at the same time, the biochemical excess of commercially used hormones, is somehow deemed *acceptable* by the same populations.

(Trans)Sex Panic

Every man sitting in this room today is half the man his grandfather was.
(Lou Guillette 1993)

In the context of a pervasive molecular invasion, it is relevant to notice how the mainstream media narrative, rather than addressing equally the many risks associated with

³ <http://critical-art.net/>

hormone-disrupting pollution, such as increased rates of autoimmune diseases, cancer, or loss of habitat (United Nations Commission on Human Rights – Commission Resolution 1995/81, U.N. Human Rights Council Resolution 36/15 2017), has overrepresented toxicity in terms of its disruptive effects on the social-biological construction of sex. General media has described toxicity as responsible for the perversion of the natural sexual order (Di Chiro 2010) by publishing headlines such as “Transsexual Frogs” (Royte and Ledner 2003), “Silent Sperm” (Wright 1996), “Sexual Confusion in The Wild” (Cone 1994), and many others. Also, several progressive organisations and environmentalist NGO have campaigned against the “feminisation” of animals and humans as a threat to masculinity (ETUI 2016).

Moreover, most of the scientific research on hormone pollution has primarily focused on the effect of pollution on sex changing. Books and articles such as “Our Stolen Future” (Colborn et al. 1997), “Altering Eden” (Cadbury 1999), “Hormonal Chaos” (Krimsky 2000), and many others, by aligning with the Wingspread Conference Statement (1991) on chemically-induced alterations in sexual development, have analysed human health problems through the perspective of a threats to masculinity. Human sex, particularly the male sex, has been described as threatened because its feminisation has been depicted as an abnormal deviance, capable of perturbing the *natural* reproductive processes, as well as of threatening the social order (Daniels 2006:69). This clear overall focus on the sexual ambiguity, variability and changeability consequences of biochemical environments has contributed to a general sexual anxiety.

Within this (trans)sex panic, the brilliant work of Malin Ah-King and Eva Hayward suggests how the effects on the environment produced by our behaviour become part of a process of “sexing”, that is of the need to “understand sex as a dynamic emergence with environment, habitat, and ecosystem” (Ah-King and Hayward 2013:1). Authors propose that, instead of considering sex as a nature-given dichotomy, is better to conceive it as a responsive potential, capable of changing both over an individual’s lifetime and in interaction with environmental factors. Thus, rather than investing on or “reasserting a politics of purity” (2013:2), it is necessary to understand how to reorient the debate away from essentialism, sexism and normativity. Like many other species that change regularly sex as part of their histories (Munday et al. 2006), the effects of endocrine disruption redefine the limits of other species’ sex determination. Consequently, our bodies are likely “shared interdependent transsex” entities, “constant processes, relations and adaptations” (Kier 2010).

Works like Ah-King’s and Hayward’s can shift the perspective on what is seen as a “biological emergency” (Hird 2006) and a threat for the organisation and reproduction of socially acceptable heteronormativity: the becoming multiple of humans through trans-sex dynamics. By doing so, and without avoiding critiques on the different responsibilities and effects of organic pollutants, they are able to frame toxicity within a responsive potential. This perspective is crucial when analysing DIWO biohacking workshops dealing with hormone knowledge, awareness and production.

Commoning Hormones

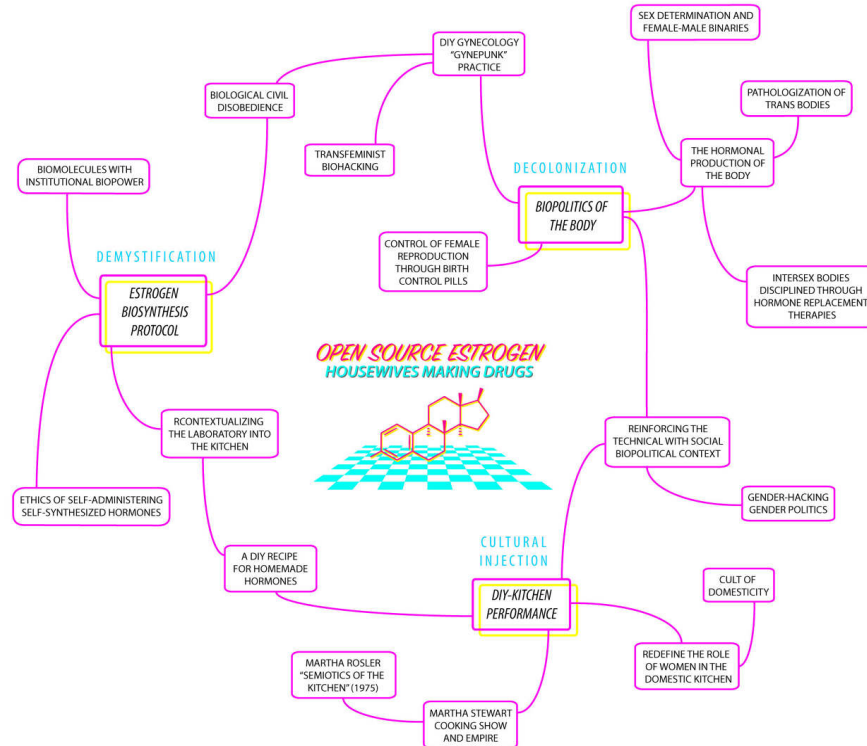


Image: “Open Source Estrogen” by Mary Maggic

Sexual life, as we know it, is changing through the transformation of toxicity and biochemical materiality, by “metabolising pollutants” (Ah-King and Hayward 2013:7) which, together with cultural movements, are testing the cultural supremacy of dualistic models of sexual difference. In this section I will look at two bio-art practices dealing with hormones, Mary Maggic’s and Power Make us Sick’s participatory workshops, both connected with a wider international network of communities and hackerspaces dealing with open-source biohacking and autonomous healthcare practices, such as *hackteria*⁴. Questioning the mode of production of molecules and the ways they promote awareness and knowledge on the topic, I will point out how the creation and sharing of open-source protocols and the organisation of DIWO biohacking workshops can be understood as a practice of commoning science, meaning a way for everyday citizens to make decisions and take action to answer the healthcare needs of their communities, rather than being locked into the profit-driven mechanics of the market, or being merely dependent on governments’ prescriptions.

The work of artist Mary Maggic aims both at reformulating the concept of toxicity and challenging the hormone market’s rules and politics. Maggic’s non-profit hands-on workshops are characterised by creating and redistributing scientific and chemical knowledge among participants. By doing so, radical access and inclusive approaches are needed, as well as the use

4 <https://www.hackteria.org/>

of participatory methods. The result is a collective re-appropriation of means of production, of knowledge and awareness about scientific healthcare practices and dynamics.

“Open Source Estrogen”⁵, one of the several art collaborative workshops led by the artist, has the ambition to develop DIWO protocols for the *domestic* extraction and synthesis of hormones from urine, as a response to the restrictive control by governments and institutions over our bodies. The project hacks estrogens present in the human body creating non-commercial access to them, which is arguably a collaborative, decolonial intervention through DIWO protocols to “openly” extract and synthesise hormones⁶.

By the re/contextualisation of a closed biochemistry laboratory into an open-source domestic protocol, “Open Source Estrogen” challenges the predominant toxicity consensus by detecting and extracting both “xenoestrogens” present in our bodies we are not aware of, and endocrine ones. From detection to extraction, through synthesis, these domestic protocols offer forms of social resistance, awareness tools, DIWO therapies that put gender hacking into practice.

Moreover, the extraction of the estrogen hormone from urine tackles several issues. Firstly, the effect of industrial pharmaceutical and petrol-chemical invasion, by raising awareness of our being “open system bodies” (Maggic 2019) that must negotiate the desired dose. Secondly, it engages with the issues of gender politics behind the hormones, definition *per se*, hormonal therapy access and, therefore, the increase of self-sovereignty and embodied agency. It does so by promoting practices whose aim is to collectively experiment with bodies, by participatory workshop methods which are understood as a form of collective bodily self-determination. Thirdly, it deals with the relation between closed biotech laboratories and the open community fields through the releasing of open-source protocols and the activation of offline participatory workshops, organized and promoted within online networks of communities of interest. Indeed, in these collective workshops, people come together to co-create and co-produce the body/world they want to live in, rather than depending solely on outside forces to sell you what you need or to provide a pre-scripted path forward.

Another significant project on trans healthcare autonomy is led by Power Makes us Sick (PMS)⁷, a feminist collective focusing on autonomous healthcare practices and networks. PMS collective develops free tools for solidarity, resistance, and sabotage “to understand the ways that our mental, physical, and social health is impacted by imbalances in and abuses of power” (2017). Through the dissemination of several anti-copyright publications (zines) produced within participatory workshops, their aim is to redistribute scientific and healthcare knowledge within autonomous communities and to support movements for health autonomy. In particular, “Towards an Autonomous Trans Healthcare” (2018) is a publication compiling historical trans healthcare notes, interviews, healthcare and essential self-defence support, food and herbal tips, a hormone info summary “for those self-medicating, searching for information, gender hackers, interested allies and health practitioners” (PMS 40), basic hotlines lists, and the address of one secure webmail through which to contact transgender communities who are hacking hormones. Also, here, radical access, inclusive approaches and the use of participatory methods are fostering the increase of bodily self-determination and hormone agency through the re/appropriation of scientific knowledge and collective healthcare practices.

5 maggic.ooo/Open-Source-Estrogen

6 Access to the open-source protocol:

http://wlu18www30.webland.ch/wiki/Open_Source_Estrogen#Urine_Hormone_Extraction_Action

7 p-m-s.life/

These participatory workshops draw on a network of relationships made under the expectation that we will each take care of one another and demonstrate a shift in thinking from the ethic of “I am on my own” to “we are in this together”. In fact, if institutions and exclusive patents produce “biopolitical fictions” (Preciado 2013) determining how bodies should be divided by gender and on how they should reproduce, heal and die; these practices of inclusion and care confront the becoming molecular mutants as a form of bodily liberation. Moreover, by resisting the dominant paradigm of modern life, which insists that what is bought and sold in the market is the only way to provide meaning and sustenance in our lives, commoning hormone molecules is a way to draw on our imagination by bringing out different ways of living. Following Hil Malatino’s words, “while trans bodies are routinely theorized as a prompt for cis folks to reconsider the ‘nature of nature’ (Barad 2015, 392) and, by extension, the nature of embodiment, we have not thought very much, or very carefully, about whether and what form of an ethics might spring from such a reconsideration” (2020).

Are you tired of...

U WOT, MS? Having to explain to doctors that you're *trans enough*?
UHHM, NO THANKS OVERPRICED online pharmacies *always* being out of stock?
 Doctors telling you you're too **CRAZY**?
 That you're **NOT CRAZY ENOUGH**? That you **DON'T EVEN EXIST**?
 Or, just not having the access to the *hormones that you deserve*?
 Well, we might have a solution!

Introducing...

**K.A.T.
 PHARMACY**



Cheap ass
 (at cost)
 hormones
 synthesized by
 actual trans
 people, tested
 on trans people,
 and distributed
 to you without
 asking bullshit
 questions!*

We support the self-identification of gender in all its forms.

Get in touch with K.A.T. pharmacy and we'll help you sort it out.
 Unfortunately, we can only offer estradiol at the moment, but we are seeking to expand to meet a variety of hormone replacement needs. We're also happy to direct you to some resources so you can feel more confident synthesizing on your own!

Image: “K.A.T. PHARMACY” by PMS

In conclusion, Mary Maggic, PMS, as well as other biohackers, artists and activists, such as Open Source Gendercodes⁸, Transhackfeminists⁹, Gynepunk¹⁰, Aliens in Green¹¹, EpathOff!¹², and many others, are challenging cultural and pharmaceutical monopoly’s gender

8 opensourcegendercodes.com/projects/osg/

9 transhackfeminist.noblogs.org/

10 gynepunk.tumblr.com/

11 pact-zollverein.de/en/artists-centre/artists/aliens-green

12 facebook.com/epathoff/

politics by commoning scientific knowledge and healthcare practices, starting from the demand that there should be “Nothing About Us Without Us!” – a slogan which was first used by the disability rights movements to communicate the need to include patients in the co-design of solutions that are sought. The assumption asks for thinking-with those/we who will be affected by these solutions for their/our entire lives.

People’s Science

Within the participatory workshop practices analysed above, digital (as well as non-digital) technologies are strengthening the possibility of including non-conventional subjects into scientific research practices, such as citizens, patients, and general web users. They challenge the ways through which research and the organisation of knowledge production can be prioritised, by pursuing the idea of the Web 2.0 as a possible democratic, participatory and commoning digital spaces (Scholz 2016). However, it is essential to remember that the principle of including non-conventional researchers into science, which has been called by different names, such as citizen science, open science, peer-to-peer science, is nothing new. Indeed, people’s science has always been entwined with both scientific knowledge and its modes of production.

As opposed to closed science, where communicative dynamics are limited by institutional walls or restricted by patents, copyright and paywalls, open science has been defined as a way to produce scientific knowledge by sharing its results and removing obstacles to circulation. However, the relation between closed and open science is the result of complex historical dynamics, none of which are external to the political and economic needs of their times. From medieval knowledge to modern molecular patents, phases of closedness and openness followed by characterising science history as a modes/ regimes of knowledge production based on different ways to finance, valorise and appropriate common pieces of knowledge. Silvia Federici argues that violence against women from the beginning of capitalism till now can be understood as a war, waged through privatisation and knowledge enclosures, against the capacity of keeping communities together and defending non-commercial conceptions of healthcare, wealth and commons (2018). Furthermore, as Valeria Graziano suggests in “Rebelling with Care”, the ability of healthcare social justice movements to autonomously organise their knowledge and practices on care and assistance systems (even before the digital turn) has to be intended as a struggle that “have often led them to clash with managerial classes in state bureaucracies and private corporations” (Bria et al. 2019:38).

From the 1940s to the 1970, governments became the major funders of public scientific research in exchange for both collective and national purposes and a contribution to the advancement of military technologies. In 1980, the US “Bayh–Dole Act” was approved (followed by similar laws in other countries) representing a fundamental change that opened the way for the new rhetoric of innovation to transfer public science discoveries to private corporations for the latter’s profit (Delfanti 2013). Within this rapidly transformed context, research, even that carried out in public universities, became proprietary and functional to industries and governments (Ziman 2002).

Today’s forms of participating in science are many and different: from online forums to crowd-funding platforms; from Wikipedia and collective books to common data-gathering platforms. However, the possibilities offered by these digital tools are not always related to effective democratisation of scientific knowledge production. Indeed, the Web 2.0’s purposes to restore a democratic and creative commoning of knowledge and its benefits, and to get it out

from behind paywalls, contend with the reality that most technologies and platforms in use are exactly the point of contention between for profit and participatory processes. For instance, there is an abundance of platforms held by private companies, which are promoting the commoning of biomedical data to be sold just afterwards (i.e. 23andMe). Thus, we navigate an area where issues related to privacy, redistribution, and exploitable free labour are evident (Terranova 2004). Consequently, this mode of popular scientific knowledge production via digital platforms is not the alternative to the market it portrays itself as, but an integral part of it, which guarantees mediatized exposure and capital accumulation (Rajan 2006), and free-market competition (Hope 2008). In Marxian words, we are not divorced from the means of production, which are indeed more and more widespread and pervasive, yet, the fruit of our cooperation is routinely expropriated by companies through increasing management, data capture and knowledge control.

Moreover, digital platforms, while revealing the extent to which social cooperation (and reproduction) is at the core of capital accumulation and economic control, are also proving that fluids and cells are the matter through which capital is fed. At the same time, digital tools have also transformed how we cooperate and reproduce ourselves and our communities within monopolistic property regimes, time management, normalisation of social relationships, and subjectivation processes coinciding with data profiling systems.

Therefore, it is crucial to try answering at least two questions. The first is about what happens when digital tools are not sustained by commercial interests, meaning they can create more autonomous and common environments, through an infrastructural design that stimulates the redistribution of shareable knowledge as the wealth produced through cooperation. The second question, instead, would be about our possibility to strike against the machine, a “strike because we care” (Women’s Strike Assembly 2020) to better understand the specificity of how the reproduction of life and social relations, through digital technologies, impacts on ourselves. In synthesis, the question is whether a disruptive intervention in the procedures and protocols in which we are involved can allow us to critically re/appraise the relationship between knowledge, power and institutions – together with an understanding of new uses of the machine as a process for strengthening social bonds and self-determination.

It follows that commoning science implies the redesign of technologies as well as the embodiment of collective scientific practices, which resist the colonality of commercial patents and knowledge monopolisation and give back centrality to self-education and “praxis of care and response” (Haraway 2016) within communities that are already in place, enabling their capabilities to resist the push to reduce knowledge to what can be bought or sold. Commoning science (and molecules), therefore, is not just thinking of scientific knowledge and data as a common good that needs to be shared freely through the hacking or re/design of technological tools. It is also the use of participatory methods able to strengthen mutual healthcare practices within autonomous communities of care. Since there are no fully autonomous infrastructures because they depend, for instance, on already existing mainstream companies’ communication networks and technologies, the selected practices attempt to conceive more autonomous *communities*, and, from here, the conditions for the creation of more autonomous infrastructures based on collective values, governance and principles, instead of individual profit. This attempt is conceived not only through the design of open-source protocols and tools but also by the use of participatory workshop methods, which are fostering time together and are giving back centrality to collective practices of healthcare self-education.

Pioneers of Tomorrow

The patents on hormones that the Reich patent office accepted in the 1920s and 1930s established precedents that were used to consolidate the notion that purified biological products, in general, should become proprietary.
Jean-Paul Gaudillière, 2008

The participatory workshop practices discussed in this article constitute healthcare as a field that encompasses biohacking, activism and art, and are strongly connected with existing social movements demanding more accessible and affordable public healthcare systems (e.g. the feminist global movement Ni Una Menos). Although these practices have a long history which will not be traced by this text, it is crucial to understand the contemporary context of monopoly on hormones' molecular patents in which they emerge and grow. In next sections, after tracing a brief history of hormones industrialisation, I will go on to explore a recent testosterone drug shortage in Italy (2109/2020) through the words of a number of Italian transgender activists, to highlight a basic rights shortage experienced by transgender persons.

The biopolitical history of hormones is longer than one might expect. As early as the end of the 19th century, serums made of animal hormones were used to treat males who were considered too *feminist*, and females considered as too *masculine*. It is here crucial to remember how the term “feminism” was first used in 1871 by a young French doctor named Ferdinand-Valère Faneau de La Cour in his doctoral thesis: “On feminism and childishness in tuberculosis patients”. *Feminism* here is understood as a pathology affecting men suffering from tuberculosis which produces a feminisation of their body (only later on was the term used to accuse men who supported women's battles for their right to vote). Likewise, in the laboratories of the time, hormones were already described and understood through gendered lenses. Thus, Endocrinology, the history of medical research on hormones, is permeated by conceptions of sex differentiation deemed to be normal versus abnormal (Fausto-Sterling 2000).

Based on these early experiments, an industry of animal extracts began to develop to treat whatever was defined as a behavioural issue, such as masculinity, femininity, homosexuality and depression. Indeed, the development and reinforcement of these “somatic fictions” (Vrettos 1995) go hand in hand with the commodification of specific molecules produced by pharmaceutical and petrochemical companies who were foreseeing their potential profitability.

The hormones era, from the beginning of 1900 to the 1960s, was a period characterised by the intensification of the pharmaceutical industry's internationalisation and competition within and across national borders. Patents and patent strategy were essential aspects of this evolutionary process. As soon as hormones were thought to have commercial potential, the industry embarked on the challenge of finding ways to mass-produce them. This strategy was a scientific but also a business issue, and one of intellectual property. In 1930, not more than five member firms (Schering, Ciba, Organon, Boehringer & Sons of Germany and Chimio) formed the “European Hormones Cartel” which was built around a set of process patents and cross-licensing agreements that gave them control over the production and sale of synthetic sex steroids (Gereffi 2017). This five-firm cartel monopolised the entire world market in hormones. Thereafter, steroids quickly became drugs manufactured by the industry in large quantities and defined in terms of structure and metabolism. In other words, the sex hormones became proprietary and a chemically constructed therapeutic agent. Moreover, the patentability of these molecules – together with their production processes – helped to conceive biotechnological

products as patentable inventions, strengthening the connection between sociocultural conceptions of purity and the proprietary system.

The double licensing aspect set a historical precedent for the patenting of biological products like genes, cells, microbes, plants and animals. In 1980, the United States Supreme Court, through the “Diamond v. Chakrabarty” ruling, extended patent laws to living matter. Soon after, in 1986, the TRIPs Agreement made property schemes converge in different sectors such as chemicals, seeds, drugs and biotechnology products. This legacy can be found in the EU Directive on the Legal Protection of Biotechnological Inventions: “... an invention based on an element isolated from the human body or otherwise produced by means of a technical process, which is susceptible to industrial application, is not excluded from patentability, *even where the structure of that element is identical to that of a natural element...*” (1998:20th point).

Basic Rights Shortage¹³

Since both the production pathways of extraction and hormone synthesis are patentable subjects, nowadays, pharmaceutical companies retain all power over hormone molecules. This route to patenting creates basic rights shortages making transgender people reliant on global drug markets that may exclude them from accessing the drugs they need. This is the case during summer 2019 when testosterone disappeared from Italian pharmacies.

In one of their latest bulletins (January 2020), the Italian Drug Agency (AIFA) confirms the temporary unavailability of most hormonal drugs, such as Nebid (Bayer), Testoviron (Bayer) and Sustanol (Aspen). When the supply of a drug is restricted, a country may lose access if the limited supplies are diverted by parallel trade, a practice that takes advantage of the price differences between different markets. Under WTO public health regulations, in fact, if there is a public health emergency, countries can use parallel trade flexibilities to import drugs. The problem arises when the drug is in short supply. By making less supply than is needed globally, monopolies can drive up the price by selling the whole supply to the country offering the highest price. This phenomenon forces the latter to buy the product – under “Emergency Conditions” and at an increased cost. The phenomenon, which generates discontinuous hormones intake for transgender people who need it, occurs in Italy alongside most parts of the world (Smiley et al. 2017). A disrupted hormone intake causes higher risks of thrombosis and chronic osteoporosis – not to mention depression and suicide rate due to the impossibility of bodily self-determination.

Another aspect to take into account is that, because of the restrictions on importing, countries can only import the drug for *essential* and *emergency* treatments (Class A drugs, listed as life-saving) and not for those considered to be less urgent and essential, such as the sex-transitioning medical pathway which is not among the authorised conditions for the use of any medicinal product. This invisibility produces as an effect the fact that hormones are difficult to catalogue in Class A (life-saving drugs). On the contrary, the present hormones’ classification (Class C), which is authorised for – non life-saving drugs for – cisgender¹⁴ people’s hormonal therapies, do not protect transgender people from the consequences that discontinuous hormone intake can generate.

13 This section was made possible in particular by the contributions of Yuri S. D’Ostuni and Samuel Spano. Starting from their own experience, they helped me to understand why in Italy the access to testosterone is never entirely guaranteed.

14 Those who feel their birth-assigned sex matches their gender identity.

Moreover, another factor that further complicates this classificatory void is related to the lack of data. For instance, in Italy, under the current legislation, AIFA can consider the introduction of a new therapeutic indication for a drug only if the pharmaceutical company that holds the marketing authorisation (in Italy, AIC) submits a request for an extension of therapeutic indications supported by related scientific evidence. However, there are no systematically collected datasets because gender transition does not follow a specific medical procedure: a perfect vicious circle. As a consequence, medical research and access to medication and care are affected, as well as increased risk to transgender people during emergencies.

In summary, what emerges from this phenomenon is that the so-called “gender dysphoria”¹⁵ is considered to not require an *essential* treatment. Thus, in the context of hormone patent monopolies, the institutional classification of what is essential and what is an emergency – and to whom – threatens to put the needs of transgender people for hormone treatment into an invisible place. Thus, two issues have arisen so far. On the one hand, the question of consent around the contradiction of being all exposed – although at different levels – to hormonal pollution, while at the same time encountering serious difficulties when desiring sex hormonal therapy. On the other hand, the question of how this same contradiction, and its related problems, entwines with the strict regulative system of hormones’ patents. This is the main context in which DIWO biohacking workshops dealing with hormone knowledge, awareness, production are rising and, by proposing a more inclusive definition on what is *essential* and to whom, are spreading.

Necessary Evil

*Consider how the model economy would behave in absence of property rights. In this case, innovators would be unable to earn the profits that encourage them to undertake research in the first place, so that no research would take place. With no research, no new ideas would be created, technology would be constant, and there would be no per capita growth in the economy. Broadly speaking, just such a situation prevailed in the world prior to the Industrial Revolution.
(Charles Jones, 2002)*

Parallel trade markets affect transgender people's access to medication and care as a direct consequence of a monopoly-based system. To strengthen this monopoly, there is the fact that every new drug, when patented, cannot be manufactured or sold by others for at least 20 years. Without competition, pharmaceutical companies can decide the price they want by claiming that the high costs are caused by research and development costs. However, as there is no transparency about how these companies invest their capital (or benefit from the appropriation of public research), no one can verify the plausibility of these claims. Although several civil society groups, projects and organisations such as “Fix the Patent Laws”¹⁶, “Fair Pricing of Medicines”¹⁷, “Treatment Action Campaign”¹⁸ and “Knowledge Ecology

15 The way in which science defined the condition by which people feel that their birth-assigned sex does not match their gender identity. This occurs till May 2018, when in the International Classification of Diseases (WHO), “gender dysphoria” was removed from the section on mental disorders. A section created *ad hoc* and called “Conditions Related to Sexual Health” was built on the occasion (known as ICD-11).

16 fixthepatentlaws.org/

17 who.int/medicines/access/fair_pricing/en/

International”¹⁹, have been working for years on accessibility to medical treatments, governments have not done much to defend themselves against pharmaceutical monopolies, or to strengthen the discourse in favour of greater access to care.

That said, sticking to the current system will never bring universal access to drugs: some will always be able gain access while others cannot. This is what “Open Source Pharma”²⁰, a mixed community who seeks new ways to discover drugs, states when promoting to: “create a movement that includes existing initiatives and develop an alternative, comprehensive, open-source pharmaceutical system driven by principles of openness, patient needs, and affordability”. In the context of sex hormone therapies, to abolish patents would help to alleviate hormonal shortage and its effects on the transgender community. Also, it would allow companies’ patent monopolies to be bypassed by engaging in more crucial research on the synthesis of hormones-for-transition. Thus, the abolition of all hormone patents would mean to invest in practices of commoning science, involving the spread of DIWO biohacking workshops such as those described above, and strengthening their relationship with the public healthcare systems. Overall, these are the main reasons why DIWO biohacking workshops, by self-producing and administering hormones, align to the “open-source pharmaceutical system” promoted by the Open Source Pharma network – besides trying to regulate and modify the margins of a monopoly-based system throughout the many connections with existing social movements for access to healthcare.

Unfortunately, the traditional arguments in favour of patents are deeply diffused and well described by Jones’s quote, which comes from its “Introduction to Economic Growth” (2002). Economic growth is linked to the establishment of a relatively secure system of intellectual property rights. However, over the last twenty years, the notion of a direct link between intellectual property protection and rates of innovation has been increasingly questioned (Hilaire-Pérez et al. 2013). Scepticism towards patents among economists was instigated by some of the early empirical studies on the effectiveness of patent protection. For instance, some studies by Mansfield (1986) and Levin et al. (1987) have highlighted that, in most industries, patents were not perceived as useful tools for protecting innovations. Consequently, firms typically worked with appropriability strategies that did not contemplate any resort to patent protection. This finding has been corroborated by later research both in the US (Cohen et al. 2000) and Europe (Arundel and Kabla 1998).

Another fascinating quantitative snapshot is provided by Moser (2005), who surveyed inventive activity undertaken outside the patent system in the mid-nineteenth century. Furthermore, empirical studies have also shown the possible negative impact of patents on subsequent technological developments. For instance, when technological change is cumulative, that is, when innovations are directly linked to previous ones, durable patent protection can have highly harmful effects on the rate of innovation (Lerner 2009).

Following this stream of research, some recent economists of innovation have attempted new theoretical appraisals of the welfare costs and benefits of patent protection. So far, one of the most influential contributions in this vein is probably that of Boldrin and Levine (2008) who, on the strength of their analysis, argue for the abolition of all patent systems. In synthesis, the abolition of the patent systems could allow sex hormone therapies to gain sovereignty instead of upholding a monopoly-based system which pretends to do so being the patron and shaper of our

18 tac.org.za/

19 keionline.org/

20 opensourcepharma.net/

needs and desires; to promote a cultural and scientific more-inclusive-reflection of what is *essential* treatment and for whom and, consequently; to widen access to transgender healthcare.

Unexplored Conclusions²¹

Valentina Coletta and Marcia Leite are two activists involved in two main struggles. On the one hand, the struggle to regulate and modify the margins of a monopoly-based system by intervening in the European institutions to promote transnational laws for reducing the profit of companies playing with transgender people's lives; on the other hand, the struggle for demanding "Informed Consent" pathways for transitioning within Italian public health institutions²², trying to break the binarism through which sex hormone treatments for transition are characterized. Just because of their main activist practices, I decided to tackle, during our conversation, the idea of synthesising personal hormonal doses within a collective healthcare practice. By doing so, many pivotal issues have arisen.

Firstly, starting from the fact that the hormonal shortage has had substantial effects on the transgender community, organising accessible forms of collective care, such as sharing open-source protocols and tools, invokes the idea of a more-attentive-to-the-person practice, and of the people's right to determine their bodies. Secondly, since there is no scientific evidence on whether the drugs available on the market are the best ones or just the only ones that can be recommended, commoning scientific knowledge challenges the possibility of engaging in more critical research on the hormones-for-sex-transition synthesis. Thirdly, participatory workshop methods of hormonal detection and extraction become a radical proposition resisting both market exclusion and cultural stereotypes.

Moreover, these collective healthcare practices respond to the desire of new types of "safer and multipurpose" (Leite 2020) spaces, where to share tools and collect data through which share knowledge about safe dosages. Indeed, from their point of view, a lot is missing when speaking about transgender care only in relation to hormone accessibility. For instance, the access necessity also to "shelters", such as safer spaces where people can come together, share and hand-on practice: "these should be spaces where to collectivise this knowledge and commonly take care of the tasks undertaken" (2020). By following this discussion, the network of DIWO biohacking local workshops should develop more and differently, according to the communities involved, increasing spaces that encourage practices of commoning science (and molecules) among people, which are able to resist profit-making, to widen the access to transgender care and, finally, to change the perspective on who is allowed to do biotech. Finally, self-determination concerning hormones, as promoted by DIWO biohacking workshops, is seen as a possibility of autonomy and revolt from the capitalist agenda of pharmaceutical industries, on which the transgender community depends: "trans community's autonomous moments of collective care become a form of struggle against capitalism" (Coletta 2020).

To conclude, when state-sanctioned and institutional sources of support are damaging, incomplete, inaccessible, or just non-existent, the request for more affordable public healthcare systems – where autonomy, self-determination, access to medical data and open-source can be guaranteed as rights – has historically been put forward in contexts of autonomous practices of

21 This section was made possible in particular by the contribution of Valentina Coletta (MIT - Italian Identity Trans Movement) and Marcia Leite (EpathOff).

22 i.e. last initiative launched in January 2020 by MIT: mit-italia.it/wp-content/uploads/2020/02/Piattaforma-MIT_Rev1.pdf

healthcare (Bria et al. 2019:37). I think of DIWO biohacking workshops within this tradition, as crucial practices in the fight to remove those inequalities promoted by capitalist science production and patents enclosing the sex hormone therapy. Such methods hold the possibility of making sure that potential scientific benefits are available to everyone instead of letting science production become a tool of oppression. Moreover, they promote awareness of the overall toxicity related to the hormone molecules invasion on our bodies and territories.

The radical potential of commoning scientific knowledge, as well as tools, open protocols, and time together, encourage us to move away from an understanding of science practice as the work of a lone genius and to recognise how networks of people have always worked together in science. This involves a challenge to the many other entangled gendered hierarchies of science production such as the white-males-access to science's rooms, which for decades has caused the one-single-perspective on knowledge, and the sexual division of labour still founded in a contemporary biochemistry laboratory, which reproduces the idea of the one-person able to gather alone at the complexity of scientific research. As Ludwik Fleck states in his book *Genesis and Development of a Scientific Fact*: "At least three-quarters if not the entire content of science is conditioned by the history of ideas, psychology, and the sociology of ideas and is thus explicable in these terms." It follows that every scientific knowledge production is profoundly entwined with the cultural conditions in which it was generated. Thus, DIWO biohacking workshops "commoning molecules" can be intended as decolonial interventions on scientific knowledge production, which aim to question whether science protocols and practices can dispel modern prejudices based on race, gender, class and nationality, by promoting participatory methods and more inclusive relational spaces.

References

- Ah-King, M., & Hayward, E. (2014). Perverting Pollution and Queering Hormone Disruption. *O-Zone: A Journal of Object-Oriented Studies*, (1).
- Arundel, A., & Kabla, I. (1998). What percentage of innovations are patented? Empirical estimates for European firms. *Research policy*, 27(2), 127-141.
- Boldrin, M., & Levine, D. K. (2008). *Against intellectual monopoly* (Vol. 8). Cambridge: Cambridge University Press.
- Bria, F., Cangiano, S., Fragnito, M., Graziano, V., & Romano, Z. (2019). *Rebelling with Care Exploring open technologies for commoning healthcare*. WeMake.
- Cohen, W. M., Nelson, R. R., & Walsh, J. P. (2000). *Protecting their intellectual assets: Appropriability conditions and why US manufacturing firms patent (or not)* (No. w7552). National Bureau of Economic Research.
- Daniels, C. R. (2008). *Exposing men: The science and politics of male reproduction*. Oxford University Press.
- Delfanti, A. (2013). *Biohackers. The politics of open science*. Pluto Press.
- Di Chiro, G. (2010). Polluted politics? Confronting toxic discourse, sex panic, and eco-normativity. *Queer ecologies: Sex, nature, politics, desire*, 199-230.
- Douglas, M. (2003). *Purity and danger: An analysis of concepts of pollution and taboo*. Routledge.
- Ensemble, C. A. (2002). The molecular invasion. *New York: Autonomedia*. Accessed October 2, 2017.
- Federici, S. (2018). *Witches, witch-hunting, and women*. PM Press.
- Fleck, L. (2012). *Genesis and development of a scientific fact*. University of Chicago Press.
- Gaudillière, J. P. (2008). How pharmaceuticals became patentable: The production and appropriation of drugs in the twentieth century. *History and Technology Journal*, (2).
- Gereffi, G. (2017). *The pharmaceutical industry and dependency in the Third World*. Princeton University Press.
- Haraway, D. J. (2016). *Staying with the trouble: Making kin in the Chthulucene*. Duke University Press.
- Hilaire-Pérez, L., MacLeod, C., & Nuvolari, A. (2013). Innovation without patents. *Revue économique*, 64(1), 5-8.
- Hird, M. J. (2006). Animal transex. *Australian Feminist Studies*, 21(49), 35-50.
- Hood, E. (2005). Are EDCs blurring issues of gender? *Environmental Health Perspectives* 113:10 CID: <https://doi.org/10.1289/ehp.113-a670>
- Hope, J. (2009). *Biobazaar: the open source revolution and biotechnology*. Harvard University Press.
- Jones, C. I., & Vollrath, D. (2002). Introduction to Economic Growth. W. W.
- Kier, B. (2010). Interdependent ecological transsex: Notes on re/production, “transgender” fish, and the management of populations, species, and resources. *Women & Performance: a journal of feminist theory*, 20(3), 299-319.
- Langston, N. (2010). *Toxic bodies: Hormone disruptors and the legacy of DES*. Yale University Press.
- Lerner, J. (2009). The empirical impact of intellectual property rights on innovation: Puzzles and clues. *American Economic Review*, 99(2), 343-48.

- Levin, R. C., Klevorick, A. K., Nelson, R. R., Winter, S. G., Gilbert, R., & Griliches, Z. (1987). Appropriating the returns from industrial research and development. *Brookings papers on economic activity*, 1987(3), 783-831.
- Liesen, L. T. (2001). *Sexing the Body: Gender Politics and the Construction of Sexuality*-Anne Fausto-Sterling, New York: Basic Books, 2000, 488 pp. US \$35.00 cloth. ISBN 0465077137. US \$21.00 paper. ISBN 0465077145. Basic Books, 387 Park Ave S., New York, NY 10016, USA. *Politics and the Life Sciences*, 20(1), 95-96.
- Lind, P. M., & Lind, L. (2011). Circulating levels of bisphenol A and phthalates are related to carotid atherosclerosis in the elderly. *Atherosclerosis*, 218(1), 207-213.
- Linebaugh, P. (2008). *The Magna Carta manifesto: Liberties and commons for all*. Univ of California Press.
- Maggic, M. (2019). Toxicity is never consensual. *Body, Logic 8: 181-187*.
- Malatino, H. (2020). *Trans Care*. University of Minnesota Press.
- Mansfield, E. (1986). Patents and innovation: an empirical study. *Management science*, 32(2), 173-181.
- Maréchal, E., and E. S. Wilks. (2001). IUPAC Projects. *Chemistry International 24.2: 17: publications.iupac.org/projects/posters01/miyamoto01.pdf*
- Mieli, M. (2018). *Towards a Gay Communism: Elements of a Homosexual Critique*. Pluto Press.
- Moser, P. (2005). How do patent laws influence innovation? Evidence from nineteenth-century world's fairs. *American economic review*, 95(4), 1214-1236.
- Munday, P. L., Buston, P. M., & Warner, R. R. (2006). Diversity and flexibility of sex-change strategies in animals. *Trends in Ecology & Evolution*, 21(2), 89-95.
- Patentability, C. I. (1998). Directive 98/44/EC of the European Parliament and of the Council, on the legal protection of biotechnological inventions. *Official Journal L*, 213(30/07), 0013-0021.
- Pletzer, B. A., & Kerschbaum, H. H. (2014). 50 years of hormonal contraception—time to find out, what it does to our brain. *Frontiers in neuroscience*, 8, 256.
- Preciado, B. (2013). *Testo junkie: Sex, drugs, and biopolitics in the pharmacopornographic era*. The Feminist Press at CUNY.
- Rajan, K. S. (2006). *Biocapital: The constitution of postgenomic life*. Duke University Press.
- Scholz, T. (2016). Platform cooperativism. *Challenging the corporate sharing economy*. New York, NY: Rosa Luxemburg Foundation.
- Smiley, A., Burgwal, A., Orre, C., Summanen, E., García Nieto, I., Vidić, J., ... & Köhler, R. (2017). Overdiagnosed but underserved: trans healthcare in Georgia, Poland, Serbia, Spain, and Sweden: Trans Health Survey. *Transgender Europe*.
- Terranova, T. (2004). *Network Culture: Cultural Politics for the Information Age* (pp. 1-192). Pluto Press.
- Vrettos, A. (1995). *Somatic fictions: imagining illness in Victorian culture*. Stanford University Press.
- Ziman, J. (2002). *Real science: What it is and what it means*. Cambridge University Press.
- 1991 National Life Science Education Summit: Report of the Wingspread Conference. (February 1-3, 1991). Racine, Wisconsin. Place of publication not identified: S.C. Johnson Foundation.