

The Art of The Semi-Living

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The field of biological arts deals with modern biological knowledge, its applications and outcomes as both medium and subject. This is a transgressive and explorative art form that draws its inspiration and discourses from a diverse array of disciplines and modes of art expressions. At this stage it seems to be too early to discuss biological art as a movement per se, but rather it can be analysed as a problematic engagement with a new medium for artistic expression. The motivations and backgrounds of the main artists in this emerging field range from formalistic approaches to total transgression of both the artistic and scientific discourses.

Works that involve living components in their presentation can be seen in many cases as time base works. They are durational pieces that can be viewed as an 'art as documentation'. In his essay *Art in the Age of Biopolitics: From Artwork to Art Documentation*, the Russian critic Boris Groys (2002) explains this turn towards 'art as documentation' as the necessary result of art understood as 'a form of life'. He writes 'it is not the making of any finished artwork that is documented. Rather, documentation becomes the sole result of art which is understood as a form of life, a duration, a production of history.'⁽¹⁾ Relevant here is the work of the Tissue Culture and Art Project of which I am a founding member.

This paper will explore the concept of partial life that led to the development of semi-Living art works, through the work of some of the leading figures in the history of partial life. The Work of the Dr. Alexis Carrel is relevant for this discussion about the epistemological, aesthetical and historical issues the practice of tissue culture for both artistic and scientific purposes. Two of the recent Tissue Culture & Art installations will be presented as case studies surveying the performative and installation staging aesthetics, and other approaches in presenting living biological systems in artistic context.

Partial Life and Semi-Living:

As the use of living tissue for artistic ends is new and mostly misunderstood, there is a need to briefly present the technology involved as well as the main epistemological, ethical and perceptual issues stemming from the realisation that living tissue can be sustained, grown and function outside of the body. In other words; parts of what is being perceived as "whole" life can "live" outside of its original body. New terms have been coined to describe this phenomenon: the common term is *tissue culture* which refers to both the process and its results. *Partial life* and *Semi-Living* (the term we use in the Tissue Culture & Art Project) are less scientific but more

fitting in the sense that they are embedded with the cultural and perceptual conflict they represent.

For the purpose of ease as well as for conceptual reasons I will be referring to the organism from which the tissue derived as the *body*; here I am referring to the universal body¹ - that of the complex organism, hence, the body of all animals with highly differentiated tissues – including human. The scientific language that is used to describe the process of tissue culture is also something we should pay attention to; the cells and tissue are *harvested* either as a biopsy from a living body or from a body that was *sacrificed*² for scientific ends or from bodies butchered for food. The cells are then *seeded* on a specially coated petri-dish or a tissue culture flask. In the case of tissue engineering the cells (or tissue) are seeded into/onto three-dimensional scaffolds made out of specialised materials. The tissue and cells are kept alive by the aid of nutrient solution, and are sustained in conditions that attempt to emulate their original environment (that of the body). Eduard Uhlenhuth wrote in 1916: “Through the discovery of tissue culture we have, so to speak, created a new type of body on which to grow the cell”. (2)

The use of terms borrowed from agriculture and religious jargon (and as we will discuss soon also from alchemy) reveal the role this branch of science would like to be seen as playing in our society – that of a redeemer and provider of “salvation” from the frailty of the current human condition.

Tissue Culture and Tissue Engineering as Biological Alchemy:

The concept of partial life, a part of a complex living being sustained alive outside and independent from the body, was rarely discussed as a cultural phenomenon, mainly due to its confinement to a scientific context. However there are reference to the border cultural and social implication of the concept embedded in the discourse of cell theory: “The introduction of cell theory in the biology first of plants (around 1825) and later of animals (around 1840) inevitably turned attention toward the problem of integrating elementary individualities and partial life forms into the totalizing individuality of an organism in its general life form.” (3). This also reflected on social theories at the time and stand as an example of social theories determining biological concepts. When in 1667 Robert Hooke observed cells structure, using one of the earliest microscopes, in a thin slice of cork he coined the word “cell” as the structure reminded him of a honeycomb. Counguillem therefore asks:” Yet who can say whether or not the human mind, in

¹ The reference of The Universal Body here is totally different from the meaning it was usually been used for in traditional art discourse: that of the body of perfect white male.

² The religious term *sacrifice* was adapted by the scientific community to describe the killing of animals for “extending human knowledge”.

consciously borrowing from the beehive this term for a part of an organism, did not unconsciously borrow as well the notion of the cooperative labour that produces the honeycomb?" (et el p. 162). He then answers "What is certain is that affective and social values of cooperation and association lurk more or less discreetly in the background of the developing cell theory." (p. 162)

However by the time that Dr. Alexis Carrel started his tissue culture experiments the tide has change. The misinterpretation of Darwin's theory of evolution led to development of the practice and theory of eugenics³ in Western Europe and the United States. DR. Carrel was an enthusiastic supporter and endorser of this practice. Although Dr. Carrel won the Nobel Prize for Medicine in 1912, anthropologist Landecker (2000) describes the widespread judgments toward him in the scientific community as "(a) a mystic, (b) a vain man who stole the limelight for tissue culture when he did not properly belong to him, (c) a hindrance rather than a positive force in the farther development of tissue culture after its initial establishment, and later in life (d) a fascist or at least a Vichy-collaborating eugenicist"(4). Dr. Carrel was heading the laboratory for experimental surgery in the Rockefeller Institute in New York, that was uniquely designed to conduct his experiments, P.R White (1954) writes:

"I have sought to strip from the study of this subject its former atmosphere of mystery and complications. The grey walls, black gowns, masks and hoods; the shining twisted glass and pulsating coloured fluids; the gleaming stainless steel, hidden steam jets, enclosed microscopes and huge witches' cauldrons of the 'great' laboratories of 'tissue culture' have led far too many persons to consider cell culture too abstruse, recondite and sacrosanct a field to be invaded by mere hoi polio." (5)

It can be argued that the Hollywood version of Dr. Frankenstein and the aesthetics of the laboratory were based on Dr. Carrel and his laboratory. Does his mystic and eugenic tendencies come as a result of his obsession with partial life? Does the creation of the precursors of the Semi-Living usher in his intolerance to the other? Carrel maintained an aura of an alchemist and got involved with the occult, as he grow older he turned away from conventional scientific research and concentrated of exploring the healing properties of prayers alongside his growing interest in eugenics and fascist ideologies. One can argue that the experience of developing partial life forms, which contradicted his contemporary perceptions of life, drove him to the engagement with the occult.

³ Eugenics – is the study of how to improve the human race by carefully selecting parents who will produce stronger children . (Collins Cobuild English dictionary) One should add that the practice of eugenics also included forced sterilisation and extermination of "undesirable elements" of the human race.

The epistemological contradictions regarding tissue culture was nicely put by R. Harrison (1913) who was the first to maintain (but not propagate) individual living cell outside of the body:

‘...it seems rather surprising that recent work upon the survival of small pieces of tissue, and their growth and differentiation outside of the parent body, should have attracted so much attention, but we can account for it by the way the individuality of the organism as a whole overshadows in our minds the less obvious fact that each one of us may be resolved into myriads of cellular units with some definite structure and with autonomous powers’ (6)

One of Carrel and Harrison's contemporaries H.G. Wells, who most likely followed Carrel's and others early experiments in surgery and embryology wrote in 1905: ‘We overlook only too often the fact that a living being may also be regarded as raw material, as something plastic, something that may be shaped and altered’. (7) He then went on to write the *Island of Dr. Moreau*, fictionally exploring this concept at the level of the whole organism, creating a unique teratologist discourse. The appropriation of parts of complex organisms, sustained and grown outside of the body, as “plastic raw material” to be “shaped and altered” seems like a more palatable version of this concept. In reality it seems that there were more epistemological barriers to the use of parts of living of complex organisms than that of the whole body. The sustenance and manipulation of parts seems to be more disturbing and confronting because it puts into question rooted perception of the inseparable whole living being. If we can sustain parts of the body alive, manipulate, modify and utilised them for different purposes, what does it say about our perceptions of our bodies, our wholeness and our selves?

The history of tissue culture and the following development of tissue engineering represent a series of major conceptual shifts in the perception of partial life and its impact on other fields of biomedical research and practice. These shifts span over a period of almost a hundred years with long periods of a standstill. It took more than eighty years to realize that cells can be grown in three dimensions to form a functional tissue. This development came from the collaborative work of a surgeon, Dr. Joseph Vacanti, and a material scientist, Dr. Robert Langer. They developed a system that use specially designed degradable polymers that act as a scaffold for the developing tissue. This work led to one of the most important icons of the late twentieth century – the mouse with the ear on it's back. This image was broadcasted and printed throughout the globe. It seemed to represent the horrors and the dreams of the new era of a bio-medical driven consumer society. For many it also indicated that the fantasy of the surrealist project is materialized through the aesthetics of scientists and medical professionals.

The image of this new chimera has triggered many responses worldwide. For artists, it has

presented the possibility of sculpting with living tissues - not without feeling concern regarding to the use of a living sentient mouse as a tool for such endeavour. Would this mouse look differently if a designer/artist were employed as part of the team? This ambiguous chimera – the eared mouse – confused many people, and one of the most common misunderstandings, propagated by the popular media, is that it was a product of genetic engineering. Not so! The ear was hand sculpted by the researchers out of degradable polymers, it was then seeded with human cartilage cells and inserted under the skin of a nude mouse. The mouse was used as a living bioreactor-providing the conditions needed for the cartilage cells to grow and gradually replace the polymer scaffold. The aim of this experiment was to prove that cartilage tissue could be coerced to grow into complex shapes and remain viable for the replacement of injured, defective or missing body parts. Developments in the design and construction of bioreactors opened up the possibilities of creating replacement body parts without the need to use mice as a surrogate body, and gave birth to the promise of the creation of semi-living tissue entities.

Tissue engineering was developed as part of the bio-medical exploration of creating body spare parts, it represents a major conceptual shift in the treatment of many ailments, injuries and deformities. "In essence, new and functional living tissue is fabricated using living cells, which are usually associated in one way or another with a matrix or scaffolding to guide tissue development" (8). The body is now seen as a regenerative entity that can be healed using its own parts (cells, tissues), which are taken outside of it, treated, manipulated and re-implanted back into body. Tissue engineering also offered the opportunity of growing and sustaining functional tissue outside the body for long periods of time and create a form of life that could never exist in nature- parts of complex organisms designed and grown independently from the organism from which it originally derived. As opposed to genetically modified organisms, semi-living tissue entities represent a much smaller risk to the eco-system (they cannot escape and cannot survive without human intervention), but may present a greater challenge to the western concepts of self, body, life and death.

The possibility for the engineering of functional utilitarian tissue constructs is culturally problematic. It might not be surprising to realise that the main examples of such a concept (i.e. the use of tissue engineering outside of the biomedical realm) can be found in the US military (9) and in the new area of wet biology art practice. The first is not interested in the broader epistemological and ethical implications while the second attempts to confront them. The form and the application of our newly acquired knowledge will be determined by the prevailing ideologies that develop and control the technology. When the manipulation of life takes place in an atmosphere of conflict and profit driven competition, the long-term results might be disquieting.

One role that art can play is to suggest scenarios of “worlds under construction” and subvert technologies for the purpose of creating contestable objects. This role of art makes the emergence of the Semi-Livings as evocative art “objects” and the multi levelled exploration of their use so relevant.

Life in the Gallery

Live Animals have been brought to the galleries by artists who were interested in “bringing life back to the art”, and transgress the notion of art as generating only still, eternal objects of beauty. The time coincided with the rise of performances art that derived from action painting (Franz Kline, Willem de Kooning, Jackson Pollock). One of the very first works to present living animals in the gallery was Philip Johnston’s 1934 installation *America Can’t Have Housing* at MOMA, a tenement slum re-creation that included cockroaches⁴ (10). This was an obvious use of art as a tool for social critique. Jannis Kounellis, *Untitled (12 Horses)* in 1969, with twelve horses tethered within the gallery was one of the most famous and transgressive uses of living animals in an artistic context. Brining one of the symbols of beauty in classical art and presenting it in a ephemeral and visceral form. In this context it is also appropriate to remark on the practice in contemporary chinse art. KD Thornton (2001) in her paper titled *The Aesthetics of Cruelty vs. the Aesthetics of Empathy* suggests that in China, the number of artists working with animals exploded in 2000, “for cultural identity and speculatively opportunistic reasons: ostensibly to attract the attention of foreign curators”. I argue that the reasons for some of the works involving animals in China were that it was one of the very few avenues of direct and charged metaphor in regard to an oppressive and heavily censored contemporary China (11). It is not a surprise than, that in 2001, China’s Ministry of Culture outlined jail terms of up to three years for bloody, violent, or erotic art, and especially target “the more extreme forms of contemporary art performances which involved live animals.” (12) Here one can argue that the law was not concerned with animal welfare. However, strong reactions about the use of animals (and on the border issue of living systems) were not only confined to places like Chine. KD Thornton gives the examples of a controversy at the Minneapolis Institute of Arts that caused the removal (by the artists, Mark Knierim and Robert Lawrence) of two chickens from a well-outfitted and comfortable installation to protect them from disgruntled activists (13) And Marco Evaristti’s “goldfish in blenders” piece generated global news reports for his exhibition in Denmark, as well as a comment from noted animal ethicist Peter Singer “When you give people the option of turning the blender on, you raise the question of the power we do have over animals.”(14). The display of living systems in the

⁴ the cockroaches were removed after complaints regarding the insulting assumption that poverty entails filth/infestation.

gallery is a move from the representational, the dead (or even the stuffed) to the actual, the living, the visceral. This seems to disturb more than just the art world.

The Tissue Culture & Art Project:

The evocative responses to art that involve living components seems appropriate to the issues The Tissue Culture & Art is trying to generate through our practice. Wet biology art practices are engaged with the manipulation of living systems for the main purpose of generating broad cultural discussion. The Tissue Culture & Art Project⁵ is exploring the manipulation of living tissues as a medium for artistic expression; it looks at the level above the cell and below the whole organism. We are using tissue engineering and stem cells technologies to create Semi-Living Entities. The Semi-Livings are made of living tissues from the body grown over/into three-dimensional constructed substrates. At this stage our Semi-Living entities grow in artificial conditions, which imitate body conditions - in bioreactors. This new palate of manipulation, at least at this stage, is significantly linked to ethical concerns and to emerging philosophical issues.

The Semi-Livings are now out of the laboratories and into an artistic context. This opens up new discourses about the different relationships we might form with these new entities and shed different light on our perception of life. The timing is not accidental. We, humans, have generated enough knowledge to manipulate different levels of life to an extent that requires us to re-evaluate our understanding of the concept of life.

When we started back in 1996 we were looking at the production of ornamental objects covered with living skin. We then explored the construction of different tissue types and substrates and began to shy away from aspects of beauty for a deeper exploration of the ethical and epistemological issues raised by their existence and concerns about life-science industry in general. By exploring different tissue types we also looked at different levels of interaction and feedback that some tissue types can generate. Here we are referring mainly to neural and muscle tissue constructs. In a sense, when we started to look at what we could get these tissue constructs **to do**, we emulated human's path of interaction with fellow living beings. We started looking for a mode of manipulation for exploitative purposes of our newly developed Semi-Livings. We are now looking at the form of the ultimate exploitation; that of consumption, of eating the Semi-Living. This form of relationship is the most problematic but also the most primal, and brings us back to the basic interaction humans have with their fellow living beings. Consumption of living beings is also an issue our modern society is trying to conceal, and one we are

⁵ Initiated by Oron Catts in 1996.

attempting to expose. This discussion raises issues in regard to society's hypocrisies towards living systems (let alone Semi-Living systems) and to the Other in general. Our Semi-Livings are Evocative Objects⁶ (15) that raise emotional and intellectual reactions and suggest alternative scenarios for a future. In order for these entities to achieve their highest evocative potential it was imperative for us to present them live to the viewer in an artistic context.

Paul Perry who presented in 1997 a poetic piece titled: *Good and Evil on the Long Voyage* in which he used living cells, to explore issues of mortality and religion, stated:

“For the exhibition, I insisted on the hybridoma being physically present (no pictures man,- I want the real thing). A cell culture is usually maintained in an intensive care unit called a bio-reactor- a very expensive device... The bio-reactor with the hybridoma culture was placed in an aluminum canoe that was raised several meters above the floor in a scaffold. In order to see the bioreactor a mirror was suspended above the canoe.” (16).

Since the beginning of our practice of the use of living tissues as part of our work we shared the same attitude that was put somewhat crudely by Perry “no pictures man,- I want the real thing”. However, fulfilling our needs required the construction of a fully functioning tissue culture laboratory. Our first exhibitions presented images of the sculptures or the sculptures themselves already fixed in formaldehyde. The importance of exposing the living visceral sculptures was obvious. We finally were able to achieve that in the year 2000.

It was extremely important to us to not only present the living sculptures in a direct view for audience (as oppose to Perry who opted for a “secondary” viewing experience by the use of mirrors) but also presenting the need for care and responsibility for these living entities. In order to do so we needed to have all that is vital for the survival of our semi-living sculptures. The basic components are; a sterile hood⁷, an incubator (to keep the tissue in the right temperature), and a bio-reactor.

We made the decision to incorporate the laboratory as part of our installations, and perform the activities needed for the maintenances of sculptures during the gallery's opening hours. This was a dangerous and risky decision on our part as the technology needed to for the production of our work seemed to sometimes dominate the piece; while the work was really about life. The audience were confronted with, at first glance, the alienating symbols of techno-science. We hoped that the viewers will meditate for a while about what it means to have a biological laboratory in the gallery and realise that we tried to highlight the contrast between the cultural perceptions of life as oppose to the techno-scientific knowledge and its application through the manipulation of living systems.

⁶ A term coined by Sherry Turkle, originally in regards to computers and other E-toys.

⁷ Sterile hood is a sterile work environment, a protected working bunch that operates by the flow of highly filtered air.

Since our first installation involving the construction of a tissue culture laboratory in an art context (Ars Electronica 2000, *Tissue Culture & Art(ificial) Womb*) we experimented with different designs for the laboratories as well as different staging of our performative actions. In the following sections I will discuss our two latest installations (presented between March to June 2003) and contrast them with our earlier installations, concentrating mainly on the issues surrounding the laboratories and the performances.

Disembodied Cuisine and Tissue Culture & Art(ificial) Womb, presented as part of L'art Biotech exhibition, curated by Jens Hauser at le lieu unique, Nantes, France.

In this installation we recreated the *Tissue Culture & Art(ificial) Womb* piece (which, as mentioned above was the first piece we were able to present our living semi-living sculptures, in the first laboratory we constructed) and presented for the first time our food related piece which we titled *Disembodied Cuisine*. As this paper discuss the laboratory and the performance of the Tissue Culture & Art project, the rational for these works is not outlined, for more information about these works please see <http://www.tca.uwa.edu.au>

The Tissue Culture & Art(ificial) Womb piece involved the construction and growth of seven semi-living worry dolls. These dolls have been hand crafted using biodegradable/bioabsorbable polymers (PGA, PLGA and P4HB) and surgical sutures to create an iconic Semi-Living entity of a Worry Doll. Originally the dolls were seeded with cells that derived from a human patient which are now classified as mouse endothelial cells⁸. In L'art Biotech we decided to use frog muscle cells (for reasons that I'll outline soon). The audience were encouraged to tell the semi-living worry dolls their worries by using a computer terminal (which we called the worry machine).^{9/10}

In the 2000 show we had to work with an architect who was appointed by Ars Electronica Festival to oversee the design and construction of the laboratories. The piece was one of three biological installations (the other two were *Nature?* By Marta de Menezes, and *Audio Microscope/Micro Venus* by Joe Davis). A decision has been made to present all three installations in similar containment areas; three clear rectangular "bubbles". The square clean design has been conceptually constructed to act as a contradictive element to the legend of the worry dolls. The whole scientifically white installation was constructed in order to keep seven little dolls; each was about one and a half centimetres long. The tension was further enhanced by hanging about twenty dead and deformed dolls (which were part of the experimentation for the piece) inside small specimen bottles. A monitoring instrument, which imaged the microscopic structure of the

⁸ McCoy cells are a cell line which, according to the literature, originated from the synovial fluid in the knee joint of a patient suffering from degenerative arthritis, however a long the way it got contaminated with mice cells and it is now considered to be mice Fibroblast-like cell line. For our purposes, it is a 'victimless' source of living material to create Semi-Living Sculptures with

⁹ As we developed our projects in the laboratories along side our scientist colleagues, we found the interactions with them and their reactions and critique of our work extremely stimulating. We believe that some of our best art works/performances were never shown in public – they happened (and are happening) in the lab.

¹⁰ You can read some of the worries, and add your owns on our web site <http://www.tca.uwa.edu.au/ars/arsMainFrames.html>.

polymer scaffold with the cells growing over it in real time and as time lapse clips, had the dual purpose of monitoring the condition of the dolls and presenting to the public the actual biological process. We then devised a ritualistic engagement with the work by setting a specific time every-day for the ceremony of the feeding of the worry dolls. The feeding was a routine laboratory procedure in which we replaced the old nutrient solution with fresh solution. The ceremony resembled feeding times in the zoo. Conceptually, that was also the time in which the audience worries from the “worry machine” have been fed to the dolls. By analysing the public response it seemed to us that many people could not see the dolls “through” the technology. People seemed to have some kind of a mental block that prevented them from getting emotionally involved with the work as they were overwhelmed by the instruments. As the bubble was clear there was no visual hierarchy to direct the attention to the tiny dolls floating inside the bioreactor.

At the end of every installation we faced with the ultimate challenge of an artist – we have to kill our creation. Transferring living material through borders is difficult and not always possible and as there is usually no-one who is willing to ‘adopt’ the Semi-Living entities and feed them (under sterile conditions) daily, we have to kill them. The killing is done by taking the Semi-Living sculptures out of their containment and letting the audience touch (and be touched by) the sculptures. The fungi and bacteria which exist in the air and on our hands are much more potent than the cells. As a result the cells get contaminated and die (some instantly and some over time). The Killing Ritual enhances the idea of the temporality of living art and the responsibility which lies on us (humans as creators) to decide upon their fate. The touching/killing rituals are our way of coercing people to face the problematic existence of Semi-Living entities. These evocative entities expose the gaps between our new knowledge, our ability to manipulate living systems, and our belief and value systems.

In L’art Biotech the dolls shared the laboratory with the semi-living steak that was grown as part of Disembodied Cuisine. Disembodied Cuisine was an attempt to grow frog skeletal muscle over biopolymer for potential food consumption. The laboratory that I designed represented a more complex architectural form than that based on many references to Dr. Alexis Carrel’s Experimental Surgery Laboratory in the Rockefeller Institute in New York. It was designed in a Mandala shape missing two of its wings, using an existing structure in the space as a starting point. A small rectangular store room has been converted to dark grey walled wing; a short clear passage linked the room to a dark soft dome with five round windows. These windows acted as portholes that directed the viewer to observe particular elements of the installation. The dome housed the sterile hood, a bioreactor that contained the worry dolls and the steak, a microscope and two monitors; one for viewing another steak growing inside an incubator positioned in the small room, and the other presented a real time microscope image of the cells growing over the scaffold. Another short clear passage connected the dome to a clear rectangular structure, not so different from the

original Ars Electronica laboratory, that was fitted with a dining table set up for six, and two fish tanks with live frogs and a black and a white replicas of Venus de Milo.

The design of the laboratory confronted the audience with an architectural form that corresponded with the exterior of the gallery, some of the great churches in Nantes and elsewhere in Europe, but also with a sci-fi version of a space station. It was not what the audience expected to see as a biological laboratory, while it maintained a direct historical reference to the history of tissue culture. It acted as a simulacrum for Carrel's laboratory and attitudes. The dining room acted also as the entrance to the lab, on which we hanged a sign reading "you are a biohazard, do not enter". The audience represented a much greater danger to the laboratory and especially to the sculptures than they did to the audience. Semi-life is fragile.

The steak and the worry dolls were both made out of the same materials and living frog's cells. In this case the feeding took place during the gallery's opening hours but with no set time. The zoo like spectacle has being avoided for more eclectic but true maintenance regime. We did however dressed with costume designed gowns that seemed like a cross between a mechanic, chef and scientists uniform, while again referencing Carrel's aesthetics.

In the last day of the show the dolls were ceremonially killed by the audience, the steak was cooked and eaten in a Nouvelle Cuisine style dinner, and four frogs that we rescued from the farm have been released to a beautiful pond in the local botanical garden.

The resolution in which we think we know the world ranges from the sub-atomic to the universe. The resolution in which we perceive the world is still of a relatively large organism ¹¹ that harbour a thing called consciousness and a concept of self. Many humans feel uneasy and even threatened when exposed to objects that might question their perceived realities. Parts of bodies of complex organisms have been cultured since 1910¹². The 'production of a new surprising form of life, cellular life in vitro' (17), presented a tangible challenge to our concept of self as well as the concept of death. As demonstrated the attitudes regarding the perception of life and the modes of manipulation of living systems, has a lot to do with the prevailing ideology. Art should play a role in highlighting the inconsistencies in our relationship to life and purpose contestable and tangible objects in order to question the directions in which these form of manipulation will take us. Through the aesthetic and performative decisions the Tissue Culture & Art choose to

¹¹ The best estimate is of around 50 million cells in the body of an adult human. This is still an estimate as some cells, such as blood cells, continue to divide and regenerate in response to different factors (though some cells like neurons, and to a large extent striated muscle, do not divide in the normal human adult). Therefore there is not a static cell count within any one person. Size differences between individuals also dictate that different numbers of cells must be present in the organs of different people.

¹² The technique was invented already by 1903 by J.M.J Jolly, but was perfected by Alexis Carrel in 1910, who actually coined the term of "tissue culture".

present their work in a way that one can follow an historical path of societal inconsistencies of the perception of partial life.

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