

## **Tissue Culture & Art(ificial) Wombs**

An Installation of Semi Living Worry Dolls inside a bioreactor By The Tissue Culture & Art Project  
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In collaboration with **SymbioticA** (The Art and Science collaborative research lab) at the Department of Anatomy and Human Biology, University of Western Australia, and **The Tissue Engineering and Organ Fabrication Laboratory**, Massachusetts General Hospital/Harvard Medical School.

The Tissue Culture and Art Project (initiated in 1996), is an on-going artistic research and development project into the use of tissue culture and tissue engineering as a medium for artistic expression.

The Tissue Culture & Art project (TC&A) utilizes biologically related technologies (mainly tissue culture and tissue engineering) as a new form for artistic expression to focus attention and challenge perceptions regarding the fact that these technologies exist, are being utilized, and will have a major effect on the future.

What is Tissue Engineering:

Tissue engineering is the creation (fabrication) of human made tissues or organs, known as neo-organs (1). It is about producing body spare parts. Tissue engineering usually involves the construction of artificial degradable biopolymer scaffolding in the desired shape, which is then seeded with the appropriate cells and immersed in a solution rich with nutrients and growth factors in conditions that try to emulate the body (37°C, 5% CO<sub>2</sub>). The system that provides these conditions is referred to as a bioreactor. With the advances in stem (embryonic) cell technology, it is in essence an artificial womb, which is being used to grow us new organs/extensions/additions.

Tissue engineering can offer an option of producing what we refer to as Semi-Living Objects. A tissue is a collection of cells of an individual organism that specialize in performing a specific task. When we combine this specialty with other tissue (not necessarily from the same organism) and artificially constructed support mechanisms, we will be able to 'grow' task specific or general use tools. The TC&A Project is interested in using tissue engineering and artificial wombs to grow sculptures.

These sculptures are still in the realm of a symbolic gesture representing a new class of object/being. These objects are partly artificially constructed and partly grown/born. They consist of both synthetic materials and living biological matter from complex organisms. These entities (sculptures) blur the boundaries between what is born/manufactured, animate/inanimate and further challenge our perceptions and our relations toward our bodies and constructed environment.

The concept of using Semi-Living Objects can be seen as a way to minimize the risks associated with new technologies as well as a way to eliminate some of the problems regarding the existing technologies and culture of consumerism. Changing the culture of production from manufacturing to growing could reduce the environmental problems associated with the process of manufacturing. The relationships that consumers will form with these semi-living objects will be different from the relationships they have with inanimate objects. Tissue engineering offers a possibility to change our own design as well as create a new breed of 'things': Presently, scientists are trying to mimic nature. However, how will we look when we decide to improve nature? Are we going to see fashion driven neo-organs? Are we going to completely objectify living matter?

We feel that not enough attention is directed at proposing, examining and questioning the possible futures where this new technology can take us.

### **The Worry Dolls:**

We chose to grow modern versions of the legendary Guatemalan Worry Dolls in the artificial womb.

“The Guatemalan Indians teach their children an old story. When you have worries you tell them to your dolls. At bedtime children are told to take one doll from the box for each worry & share their worry with that doll. Overnight, the doll will solve their worries. Remember, since there are only six dolls per box, you are only allowed six worries per day.” (2)

We decided to give birth to seven dolls, as we are not kids anymore. We may not be allowed to have more than six worries but we surely have. The genderless child like dolls represent the current stage of cultural limbo: a stage, that is characterized by child like innocence, and a mixture of wonder and fear when we create the new sex – hence, a new era.

We gave them alphabetical names as we think that we can find a worry for each letter of the language that made us what we are now. While working on the Tissue Culture & Art Project, people expressed to us their anxieties. These dolls represent some of them. You are welcome to find new worries and new names... You will be able to whisper your worries (not just in terms of biotechnology) to these dolls and hope that they will take these worries away.

**Doll A = stands for the worry from Absolute truths, and of the people who think they hold them.**

**Doll B = represents the worry of Biotechnology, and the forces that drive it. (see doll C)**

**Doll C = stands for Capitalism, Corporations**

**Doll D = stands for Demagogy, and possible Destruction.**

**Doll E = stands for Eugenics and the people who think that they are superior enough to practice it.**

**Doll F = is the fear of Fear itself.**

**G= is not a doll as the Genes are present in all semi-living dolls.**

**Doll H = symbolizes our fear of Hope...**

Our worry dolls were hand crafted out of degradable polymers (PGA and P4HB) and surgical sutures. The dolls were sterilized and seeded with endothelial, muscle, and osteoblasts cells (skin, muscle and bone tissue) that are grown over/into the polymers. The polymers degrade as the tissue grows. As a result the dolls become partially alive!

Will they take our worries away?

The process, in which the natural (tissue) takes over the constructed (polymers), is not a “precise” one. New shapes and forms are created in each instance, depending on many variants such as the type of cells, the rhythm of the polymer degradation and the environment inside the artificial womb (bioreactor). It means that each doll transformation cannot be fully predicted and it is unique to itself. Our ‘next sex’ is still in the realm of a dialogue with nature rather than a complete control over it. Our dolls are not clones but rather unique.

### **Art(ificial) Wombs and the next sex:**

This is the age of loss of innocence; we are pushing our humanistic traits of curiosity and manipulation, trying to reach the ultimate border. We are learning to manipulate the building blocks of our own (and other organisms) bodies.

The next sex, created in the artificial womb, may be a cold calculated act for the ‘best’ sex. This act of procreating would be remote from the sacred and emotional ritual of what we consider sex today. The artificial womb located outside of the body (equally separate from the male and female bodies) will be where the act of procreation occurs. We will costume design the womb to

represent our individuality and become emotionally attached to it since this is the place of the real act of sex.

Will we still attach to sex so much importance, or will we be, at last, free from sex as a compulsory act for creation. We might be able to physically (and mentally) free ourselves from the 'natural' binary constraints of sex to create new forms and new plays.

Are we mature enough to make this passage?

We need to be aware that in order to face the challenges and responsibilities we forced ourselves to confront, we have to immerse ourselves in these issues. We are not innocent anymore (we were never innocent).

1. Tissue Engineering: The Challenges Ahead, by Robert S. Langer and Joseph P. Vacanti, Scientific American, April 1999, pp. 62-65.

2. Taken from the written note attached to the Worry Doll package.  
Worry Dolls were purchased from a comic shop in Boston, USA.