The Genetic toolbox: An Exploration of genetic manipulation through glass sculpture

Heather Jones
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By

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Approvals

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Original Thesis Statement

Basic cell structures and how they replicate themselves to build life forms has been an integral part of my work in my undergraduate studies. In researching cell images, I began identifying basic shapes within biological forms and finding repetition within nature. While exploring these visual images my attention shifted to the functions within a cell. I was intrigued that the smallest cell has the ability to carry the DNA to create large complex forms. The natural mapping of life is an issue I would like to explore in further depth.

Through my thesis investigation and the resultant series of sculptural glass, I would like to raise public awareness regarding the social impacts of genetic manipulation within our environment. I will utilize cell imagery in my sculptures and paintings along with metaphorical images to communicate elements of the genetic story. The use of glass in my sculptures will give the forms a translucent skin and allow the internal cell imagery to be viewed.

The issue of genetic manipulation is complex and there are many different perspectives. I personally have concerns about the possible ecological impacts caused by genetic alterations. As we change the genetic make-up of living organisms to meet our needs, we may create ecological imbalances that will adversely effect our environment. There are also many beneficial results that are developing from genetic medical and
agricultural research. Through my work, I intend to explore these issues from a social perspective dealing with the human interaction with genetic research.

The goal of my thesis exploration will be to honor the cell and genetic structure, and to address social impacts of genetic experimentation/alteration. The culminating artwork will be a social commentary regarding the present debate that surrounds the issues of genetic manipulation in our culture and environment.

**Thesis Statement Explanation:**

Looking back on my original statement, I believe that I have narrowed down the statement to the issue of biotechnology in plants. Instead of dealing with all cells and genetic manipulation the work has become more articulate in content. Throughout my thesis investigation my intent has consistently been to interest the viewer in genetics. More specifically, educate the audience about the splicing process and create a personal dialogue that evokes a questioning of the personal and environmental impacts of genetically modified foods. I believe in the old saying “We are what we eat”. As we genetically alter our environment, are we in fact altering ourselves? Biotechnology is still in its infancy and there are still mysteries that we have not yet uncovered. The benefits include higher yields, fewer pesticides, and better nutrition. There are also tentative risks such as, new allergens to foods developing, modified crops spreading genes to wild plants, and insect resistance to engineered toxins that lead to the development of super bugs. This is what we do know. Genetic researchers admit that there is much still unknown and awaiting explanation. Exploration of biotechnology
involves a sense of intrigue and adventure, although there is also a fear of change. There is the possibility that these experiments will transform humankind’s evolutionary path. When we start changing nature’s interconnected parts how will this affect the larger ecosystem?

I believe that art can be utilized as an avenue for communication and the expression of ideas. In agreement with this ideal, art writer Lucy Lippard states, “To affect perception itself, we need to apply ideas as well as visual forms to the ways in which people see and act within and on their surroundings. All art is a framing device for visual and/or social experience.” ¹ In the beginning stages of developing my thesis content I focused on the question of what I wanted to express. What do I personally value and want to make art about? The environmental impacts of genetic research and the ideals stated above are expressed in the art I create. Through this body of work I have developed my own creative interpretations of the Genetic Tool Box used to splice new genes into a plant’s DNA structure. In the actual process, each gene has certain characteristics and functions that are utilized. Through my sculptures of these viral, bacterial, and genetic images, I have accentuated their unique characteristics and mystical qualities. This approach is intended to inform people that these processes are unusual and worth looking into. When we as the consumer eat genetically modified food we ingest these genetic tools as well as the newly improved plant.

These processes have the ability to affect each of us personally through our own consumption, as well as causing long-term effects on the larger environment. According to a recent National Geographic article, “Environmental Scientists worry that genetically engineered crops are being developed too quickly and released into millions of acres of farmland before they have been adequately tested for their possible long term ecological impacts.”  

We as consumers and human beings have an invested interest in these scientific inventions. The outcomes of these decisions may change the way we live, what we eat, and the quality of the surrounding environment. These questions have inspired me to research biotechnology and educate myself in the present issues surrounding genetic engineering. My own sense of questioning has conceptually been a motivating factor in the development of this body of work.

Artist’s Background:

As a child, I grew up in a subsistent living situation. My family took part in the Back to the Land Movement that took place in the 1960’s. Their motivation was to be self-sufficient and live off the land. They were looking for a simpler way of life that offered more freedom of time and independence from society. Subsistent living involves a tremendous amount of manual labor. My father would say that “electric was a workhorse and without it we become the horse.” My family pumped water from a well, heated the house with wood that was cut from our back yard, used candles for light, and grew all of our own food. My chores included milking goats and collecting eggs every

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morning. Growing up this way, I gained an appreciation for the environment and my own participation within nature. I took part in the processes of gardening and farming. I developed a respect for the relationship between those plants and animals, and their way of life interconnecting to my own. I have learned the distinction between organically grown and commercially grown food from first-hand experience. I can taste the difference in flavor when vegetables are fresh from a garden verses store-bought. I know that if you feed an ostrich grain with molasses in it, the meat of the bird will taste sweeter when cooked. I can smell the lingering scent of the living animal when I eat meat. The natural flavor of vegetables is also pungent when freshly picked. These are personal connections I have made with my environment, and I value these sacred relationships. I believe that we are actively connected to the environment in which we live. My personal sensitivity to this connection has made me aware of recent environmental changes taking place. In the store there are fewer varieties being offered and the vegetables that are on the market have a visual perfection that has been engineered. Presently, “sixty percent of America’s food has been genetically engineered.” ³ In the United States the government does not require genetically altered food to be labeled, so the public consumer is not aware of the transgenetic foods on the market. The food industry has responded by labeling and advertising the small percentage of organic foods available. My background has taught me that the process of agriculture and farming is directly related to the quality of the product.

Thesis Investigation:

During my undergraduate studies, I became very interested in the visual aspects of biology, so I researched cellular structures. I focused on the internal map that cells possessed and how they followed this direction in order to build larger living organisms. In my work I began making glass murini that resembled cells and utilized these images as building blocks for sculptural images. The transparency of glass reminded me of cellular images. A cell contains a dark nucleus with layers of clear fluid membranes surrounding the center. When gathering glass, translucent layers begin to form and can be made to resemble this cellular structure. There is a sense of centrifugal repetition that inherently occurs when working with glass. I relate this circular motion to the way, in which cells move and replicate themselves.

The years after college, I continued to research and learn more about biology. My focus began to change from the visual aspects of biology to the more functional and emotional relationships that we perceive regarding biology. I began painting and sculpting body imagery and I became interested in my relationship with the body as a cultural icon. Dorothy Nelkin’s perspective was influential in relating biological elements to humanity. In reference to gene she states,

Though it refers to a biological construct and derives its cultural power from science, its symbolic meaning is independent of biological definitions. The gene is rather, a symbol, a metaphor, and a convenient way to define person-hood,
identity, and relationships in socially meaningful ways. The gene is used, of course to explain health and disease. But it is also a way to talk about guilt, responsibility, power, privilege, intellectual and emotional status. It has become a super-gene, used to judge the morality or rightness of social systems and to explore the forces that will shape the human future.

We make our own assumptions in relation to our biological body and there is a sense of narrative within society and science. I became interested in the story, mythology, and folklore that inter-twines science with society. My own sense of symbolism evolved from these prior ideas, metaphorically utilizing images of the body to represent social conditions. These influences led to my chosen thesis investigation.

My desire to communicate environmental ideals through artistic expression has created a narrative in my artwork. As a visual writer, I told the genetic the story to my audience with emotional expression as well as the informative aspects. The personal connection between the viewer and the story is important. The tale involves each of us on a personal level and affects the world in which we live. Most Americans are not aware that they have been eating genetically engineered food since the early-90's. Further more, the majority of people do not understand the difference between genetically engineered produce and conventional farming techniques. Through the genetic process, engineers can transfer genes from any living organism and permanently

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place the desired gene into any living organism. The human imagination can now physically create an infinite array of life forms.

When clarifying the content of the artwork I decided to focus on the actual process used to splice genes into a plant’s DNA. This serves as an introductory avenue into genetic engineering to present to the viewer. My intent is to communicate to the viewer that these processes are changing the food we eat and may negatively affect each of us on a personal level. My work is intended to lure the viewer in with sculptural forms and visually engage the viewer with the fascinating aspects of these genetic processes. The work involves the idea of consumption and our personal relationship with the food we ingest. The personal activity of consumption is juxtaposed with these imaginative creatures that are a metamorphosis between human organs and microorganisms. When the viewer is involved, the work sends the factual message in descriptive text that these genes have function and do exist. The work satirically poses the uncomfortable idea that we may be ingesting things that are unusual or unfamiliar. We as human beings are involved in the changes taking place. Author R.C Leowentin suggests that, “Every living organism is in a constant process of changing the world in which it lives by taking up materials and putting out others.” 5 This very act of consumption is being questioned in my thesis exhibition.

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Concept:

The corporate motivation to genetically engineer food is to create a more desirable product. This goal includes making food look and taste better as well as improving the agricultural aspects of the food crops. Michael Pollan discusses the force of human desire on the evolution of plants and says, "The survival of the sweetest, the most beautiful, or the most intoxicating proceeds according to dialect process, a give and take between human desire and the universe of all plant possibility."\(^6\) Successful business is based on increasing human consumption and satisfaction. These factors reinforce economic growth as a major motivator in the experiments being done on plants. Leowontin also stated that,

So long as efficiency and the maximization of profit continue to form production without reference to the means, remains the motivating forces of productive enterprises the world over, so long as people are trapped by economic need or state regulation into production and consumption of certain things, then one pollutant will continue to replace another.\(^7\)

Since corn, soybeans, and cotton are the major cash crops in the United States, they were the first agricultural crops targeted for genetic alteration. Now patents are being placed on genetically altered produce and scientific companies have been given the opportunity

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to claim ownership of the seed business. By changing a few genes in a plant, companies can own the building blocks of life in these crops and this is a new concept in economics. In this setting, moral values are sometimes secondary to economic greed. This is where public education becomes important. The consumer needs to be aware of what kinds of genetic experimentation are being done. They also need to understand that as consumers we support and reinforce corporate decisions through our spending choices.

Creating and altering life’s blueprints constitutes a powerful ability to change history and control the future of a living organism. The Prince of Wales stated that, “This kind of genetic modification takes mankind into realms that belong to God and God alone.”

Scientists are now in position to make these decisions and companies are investing in the opportunity to take part in genetic developments. Leowontin also suggests that, “Science is more than an institution devoted to the manipulation of the physical world. It also has a function in the formation of consciousness about the political and social world.”

In the controlled setting of the laboratory they cannot predict what will happen when a plant is introduced into the wild environment. Scientists can meet specified corporate expectations and create intentional properties within a plant. Experiments can only go so far in predicting how these changes will impact evolution and the wild ecosystem.

I use the *Genetic Toolbox* in my work as an introductory avenue for presenting the processes of biotechnology to the viewer. The function of this team of genes is to splice

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new DNA into plants. I was interested in the way scientists described these genes. Their intensely passionate views on their research showed in the colorful descriptions given to these microbes. Often their descriptions attributed certain characteristics to the genes. Many genes were assigned nicknames that gave clues to their function. As an artist, I quickly started to formulate my own vision and creative interpretation of what these genetic characters looked like. Through my sketches the genes began taking form as if they were theatrical characters. For example, the Bacillus Thuringiensis gene protects a plant from deadly insects, so the sculptural body of this gene had epidermal cells painted on the surface suggesting the similarity between the skin’s ability to protect and BT’s ability to protect a plant. As the work materialized into glass form, the characters took on a more detailed three-dimensional quality. I worked with paintings of body imagery that possess similar functions as the gene. Insinuating that our bodies have similar biological functions as all other living organisms; filtration, circulation, consumption and protection systems are in place to keep us alive. Through material experimentation, aesthetic decisions regarding these images were figured out. This is how the glass paintings became encased and suspended inside the glass form. The outer form embodies the personality characteristics and the interior image describes the genetic functions. The story began to unfold within the dialogue between the glass sculptures. The genetic functions of each piece started to make sense as a working process. Then the plot became clear that the treasured genes are shuttled in as passengers riding the Pack-Mule powered by the Promoter and protected by the Bodyguard. Each glass sculpture stands alone as a powerful object and takes part in the larger process represented by the body of work. I felt that my vision of these scientific tools would interest and assist the general
public in understanding the process of DNA splicing. This process is other-worldly in many aspects, strangely small yet simultaneously powerful. Utilizing a virus to carry in and infect a living thing with a desired genetic make-up is an incredible invention to be respected as well as feared.

Through my work I wanted to create the *Genetic Toolbox* in a way in which the viewer would be drawn in by the aesthetically engaging sculpture and then gain a personal understanding of the process. The glass sculptures possess beauty in their form and a conceptual mystery in the paintings and mixed media connections. The viewer is able to understand the body imagery and is engaged in the glass organisms created. A sense of recognition occurs as the viewer realizes that they are ingesting these genetic characters daily. The consumer has a vested interest in exploring the work further as they begin to understand that there are also informative facts incorporated into the body of work.

**Technical Process of developing Genetic Characters:**

*Conceptual Experimentation within Glass Media:*

My developmental process began by reading the descriptions of the genes. I proceeded to sketch the forms based on the descriptive qualities. Then outer forms began to take shape in glass. The transparency of glass was ideal for portraying the fluidity of living microorganisms. Taking into consideration the idea of the glass as a fluid skin, I began experimenting in glassblowing the outer forms. Many of these experimental
versions had human and animal parts morphed together. These pieces were discussed as fish-like or reptile-like. These metamorphic synonyms brought another level of meaning to the images. I began making decisions about what parts needed to be put together to develop the characteristics of each gene. For example: The 35 S Promoter swims between eukaryote and prokaryote worlds and so the sculpture became part fish. Early in my exploration of the glass media, I was painting on plate glass and doing flat fusing, while separately working on glass-blown shapes. In my sketches I wanted to incorporate the glass paintings into the blown forms. Glass was ideal in creating an internal and external dichotomy within the work. I began investigating (Paradise Co.) enameled paint pick-up techniques. The decision was made that the paintings needed to be suspended internally within the blown forms. The outer shape kept an integral structural form mimicking the animalistic and genetic qualities, while the internal paintings possessed human qualities and functions. Metaphorical images of human organs were utilized to exaggerate a particular gene’s function. For example: Agrobacterium is a rod-like microbe that drills into a plant’s DNA. To emphasize the genes aggressive nature teeth were painted on the piece. Kidneys and intestines insinuated filtration qualities. Epidermal cells refer to a protective layer. A backbone accentuated strength and structure within a gene. The scale of the glass genes created were enlarged to let the viewer know that these images although normally invisible to the naked eye are significant.
Material Experimentation with Glass:

Glass Painting:

My technical investigation was primarily focused in the area of glass painting. I have spent two years exploring ways to paint and optically utilize these images in glass. I started working with high temperature enamel paints on layers of flat plate glass and fusing the paintings together. This included Paradise Paints, Ceramic Enamel glazes/chalks, and later Rouche enamels. The work continued to evolve with more variety in brush strokes and textural techniques. By developing more detail in the painted layers the depth of the images continued to improve. In earlier stages the painted images were fused layers of plate glass and the focus was to create depth within the transparent layers. Then I optically experimented with adding painted elements into solid cast forms. As the genetic characters evolved the painting were made more three-dimensional by encasing them within a blown glass form.

Glassblowing:

Glassblowing was utilized to create the outer membrane of these organisms as well as structurally suspend the painted interior image. The investigation of blowing the various shapes was also a motivation in improving my glassblowing skills. The morphed images were very imaginative and evolved technically to suit the ideas. In the final series, each piece was blown in two parts. The first part would be blown and flattened on one side. This form was then sandblasted and painted on the flat side. Then the piece
would be brought back up to 1050 degrees and picked back up on an identically shaped blown part. The piece was then formed into the final shape with the painting suspended in the interior center of the piece. The interior paintings were meant to show the internal functions of the gene and human body parts were used to suggest these functions.

**Mixed Media Connections:**

There was a visual connection that needed to be shown to the viewer concerning the alterations between the genes and plants. I did many experimental connections before I found something that worked. At one point, I purchased fifty pieces of tubing and fifty random connector parts. Then I assembled these parts together in as many different ways as possible. This experiment did lead to the acknowledgement that it is sometimes easier to make what I’m looking for instead of trying to find it. I started to make my own rubber fittings so that the glass and the tubes would piece together properly. I wanted the fittings to look as if they were being used, although they had to keep an unidentifiable quality to them. The liquid rubber had a translucent wet look when it dried and aesthetically went well with the glass. In the final work, the connector parts used to attach the glass to agricultural vegetation, were intended to insinuate the touch of man’s experimentation. The fixtures were carved and cast with a rubber resin. Electrical, plumbing and medical parts were integrated into these connections. I decided to choose the connectors for their aesthetic and expressive purpose rather than the original functions of the connectors. The transparent tubing was filled with condensation to give a sense of the metabolic processes working inside the forms.
The presentation was intended to be a clinical setting. Pedestals were lined with stainless steel to suggest a laboratory. Each piece had a scientific description that was carefully displayed under glass in the right hand corner of each pedestal.

**Influential Artists:**

Cappy Thompson came to the Rochester Institute of Technology (RIT) earlier this year and gave a lecture on *Grisaille* painting techniques. She was an inspiration and watching her demonstrations encouraged me to pursue glass painting in more depth. Cappy tells her own story and paints folklore images of her daily life. I can relate to her way of working and strive to create a narrative in my own work. Technically she taught me a great deal about the use of Rouche enamels. It was encouraging to witness her perseverance and years of experience in the art field.

Walter Zimmerman was influential in my investigation of mixed media connections and we share similar ideals regarding the glass media. Walter states in his Thesis, “Like the human body, glass is also remarkably supple, ductile, and responsive.”10 Although I chose a much cleaner aesthetic in my own work, I looked at many of his pieces and how he used materials in his sculptural connections.

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Conclusion:

My goal of creating public awareness about the dangers of genetically modified food was successfully indicated by the public response to this body of work - favorable and strong evidence of genuine interest. The genetic forms, as well as the ideas behind the work intrigued people. In my observation of the viewer, I noticed that people took there time reading the descriptions and reviewing each piece individually. Many people went through the work several times in an attempt to understand the work as a whole concept. The written descriptions assisted the audience in understanding the scientific concepts. I believe that people understood and reacted favorably to the body of work.

The artwork was clearly understood on a conceptual level by my peers and committee members evidenced during final critiques. It is my impression by observing the audience, that many people appreciated my creative interpretation of the genetic toolbox on other levels as well. The forms and the interior biological images offered a sense of intrigue. The connections between the glass images and the vegetation established the environmental questions. The scientific descriptions backed up the creative work and placed value on the education elements within the body of work.

Comments among my peers included the following ideas regarding the thesis exhibition. The body of work was cohesive conceptually as well as technically. Similar techniques such as glassblowing the forms, the enameled paintings, and the style of the connection parts were utilized in a consistent manner through the work. The glass
elements were carefully considered and well crafted. I agree that these elements in the work made the conceptual aspects more clear.

Through my thesis investigation and the body of work created, social impacts of genetic manipulation within our environment continued to be a consistent focal point. The ability to do in depth research on a subject and relate that to my sculptures has given my work a stronger conceptual validity. I have always considered myself a visual writer and I enjoy telling stories through the art that I create. I would consider my thesis the first chapter of a series of works dealing with environmental issues. Over the past year, I have been able to explore my own ways of making art and ways to express my conceptual ideas more clearly through the sculptural media. Through this exploration, the ability to create a visual mood, plot, and characters within my sculptural stories became more articulated. I have created my own artistic language that consists of visual metaphors and symbols. I have a better understanding of how and why these images are meaningful to me and I will continue to use this language in future work.
Ingestion

Description: To take into the body and consume.

Materials: Glass, rubber, wool, soybeans, tubing

Dimensions: 22"x8"x6"

Artistic Explanation: The glass head is filled with soybeans and rubber. A tube connects the head to a glass stomach full of rubber and deteriorated matter. The piece takes a closer look at the action of consumption.
**Agrobacterium Tumefaciens**

*Scientific NickName:* Pack-mule

*Description:* A rod-shaped bacteria that aggressively moves between prokaryote and eukaryote worlds.

*Genetic Use:* Scientists use the bacteria, as mule to carry and permanently insert desired genes into a plant's DNA structure.

**Materials:** Glass, watercolor paint, rubber, corn, wool

**Dimensions:** 20"x8"x8"

**Artistic Explanation:** The solid glass body is shaped like a drill and painted with a veracious set of teeth, giving this piece an aggressive quality. The outer surface of the back tail is roughly textured with sand contrasting the smooth optics of the frontal tip. The inside is packed with a silicone and cotton mixture offering the ideal of a heavily loaded traveler.
35 S Promoter

**Scientific NickName:** Promoter

**Description:** A powerful virus that sends a plant’s genes into overdrive.

**Genetic Use:** Scientists use the virus as an engine that drives and forces desired genes into a plant’s DNA.

**Materials:** Glass, enameled paint, rubber, corn

**Dimensions:** 22”x8”x8”

**Artistic Explanation:** The outer fish-like form portrays this gene’s ability to swim through these biological environments. The clear transparency of glass gives the exterior structure a fluid membrane shell. It’s strength is its famous trait. This was expressed by the interior image of a backbone representing its strong nature. The glass body is connected with amber rubber fittings and latex tube to a peatree dish of corn. The corn symbolizes agricultural experimentation and the insinuation of an alteration taking place.
Kanamycin Resistance Gene

**Scientific NickName:** Body Guard

**Description:** A gene that is antibiotic resistant.

**Genetic Use:** Scientists use the gene to protect genically transformed cells and this acts as a marker for the test crops. When a crop is sprayed with an antibiotic only the successfully altered plants survive.

The Kanamycin Resistance gene is shuttled in as a passenger riding the Pack-mule powered by the Promoter and protected by the Bodyguard.

**Materials:** Glass, enameled paint, rubber

**Dimensions:** 12"x10"x10"

**Artistic Explanation:** The kanamycin gene is shaped like a prickly pear offering a sense of protection for what exists on the inside. The sterile white color represents the antibiotic qualities that are so appealing in this gene’s function. The interior large intestine symbolizes the filtering abilities possessed by this character. The amber fittings and clear latex tube run water between the two halves giving the illusion of a relationship between the two segregated parts of the form.
Coat Protein Gene

Scientific NickName: Cross Protection

Description: A gene that produces a protective surface.

Genetic Use: The gene acts as a vaccination for plants protecting them from infection.

The Coat protein gene is shuttled in as a passenger riding the pack-mule powered by the Promoter and protected by the Bodyguard.

Materials: Glass, enameled paint, rubber, tree roots

Dimensions: 12”x10”x10”

Artistic Explanation: This small smooth glass form looks like a typical cell and houses the kidney image in representation of the filtration of fluids. The bottom half is filled with roots that have a similar filtration system. Conceptually these two forms make a connection between humans and plants functional make-up. The amber fittings loop into both glass parts reinforcing the idea of combining these two images. The self-inclusion symbolizes the protective nature of this gene and it’s ability to protect these interior functions.
Glyphosphate Resistance Gene

**Scientific NickName:** Round-Up Ready

**Description:** An enzyme that acts as a resist blocking the chemical glyphosphate from adhering to a plant's cells.

**Genetic Use:** By inserting this gene into a plant's DNA structure a plant will be able to survive being sprayed with the Round-Up Ready herbicide. Weeds surrounding the plant will die from the herbicide and the plant will survive.

The Glyphosphate Resistance gene is shuttled in as a passenger riding the Pack-mule powered by the Promoter and protected by the Bodyguard.

**Materials:** Glass, enameled paint, rubber, copper, corn

**Dimensions:** 14"x12"x10"

**Artistic Explanation:** The outer glass form has an amber prickly exterior giving a sense of interior protection. The interior painting of the small intestine represents the filtering qualities of this gene. The amber rubber fittings attach the coated piece of corn to the glass form. This image symbolizes glyphosphate’s protective layers.
Bacillus Thuringiensis Gene

*Scientific NickName:* BT

**Description:** A gene microbe found in the soil that secretes a toxin deadly to insects. When ingested by the insect the toxin disintegrates the digestive tract. The toxin is not harmful to plants and acts as a natural pesticide.

**Genetic Use:** By inserting the BT gene into a plant's DNA structure the plant itself is able to excrete the BT toxin killing predator insects surrounding them.

The BT gene is shuttled in as a passenger riding the Pack-mule powered by the Promoter and protected by the Bodyguard.

**Materials:** Glass, watercolor paint, rubber, plants, ladybugs, soil

**Dimensions:** 12"x8"x8"

**Artistic Explanation:** This glass ball is painted with epidermal cells creating a protective skin for the plant that lives within the form. A clear string of glass runs through the ball representing the deadly viruses that are being filtered out. On the exterior ends of the glass string, viles of dead ladybugs have been connected. This symbolizes the gene's ability to protect plants and kill insects. The piece fills with condensation reinforcing a living environment.
Bibliography:


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