

How Animal Research Ensured I Grew Up With a Mother

My mother had cancer, yet she seemed like a perfectly healthy new mother. Completely unbeknownst to her at the time, she had developed breast cancer while pregnant with me. The strain of pregnancy had suppressed her immune system to become susceptible to the cancer, and the lump in her breast was given time to grow as it hid under the swelling during the nursing period. I had essentially given my own mother cancer. Pathology reports confirmed Stage 3 D inflammatory breast carcinoma. Along with this diagnosis, she received a predicted twenty percent chance of living past five years. A 20% chance of living to see my fifth birthday party. I had given my mother very slim odds. However, her doctor soon found a developing clinical trial, a trial that allowed for more intense treatment of the cancer through the use of a procedure called a stem cell rescue.

A stem cell rescue, also known as an autologous bone marrow transplant, is a procedure done to bypass the fatal effects of aggressive cancer treatments. Aggressive treatments, such as high-dose chemotherapy and radiation are normally the best course of action for a late-stage cancer patient such as my mother, but both have the side effect of killing the patient's bone marrow. The bone marrow contains hematopoietic stem cells, which produce the white blood cells that are responsible for fighting off infections and any foreign bodies that make their way within the body. Without bone marrow, a person would have no stem cells, and in turn would have no white blood cells, therefore leaving the patient deathly susceptible to even simple ailments such as the common cold. A stem cell rescue harvests the patient's own stem cells prior to treatment via IV, and then replants them in the patient following treatment, where the stem cells regenerate themselves. Essentially, a piece of the immune system is taken beforehand, and saved for after

the aggressive treatment, therefore enabling the cancer treatment to kill the cancer and not the immune system.

However, this procedure never would have been developed and never would have saved my mother's life had it not been for vital research done on animals. In 1961, researchers completed a study measuring the sensitivity to radiation in normal mouse bone marrow cell by injecting marrow cells into hosts that had been previously exposed to supralethal irradiation. This led to the formation of colonies of proliferating cells in the spleen of the host animals. The number of colonies were then counted, and related to the number of cells injected to show the sensitivity to radiation of normal adult mouse bone marrow cells. These results allowed researchers to project how many stem cells needed to be collected prior to the stem cell rescue in order to rescue the immune system of the patient following treatment.

In a 1985 study, rhesus monkeys were administered the chemotherapy drug cyclophosphamide and then given an autologous marrow infusion in an attempt to reverse the effects of the chemotherapy. Monkeys given up to 200mg/kg of cyclophosphamide and then the stem cell rescue were shown to make a complete hematopoietic recovery, but doses pushed up to 240 mg/kg were fatal. This research showed that the stem cell rescue has a certain threshold of chemotherapy it can protect the body from, and that it is extremely important to balance the amount of chemotherapy administered along with the transplant of autologous bone marrow appropriately in order to avoid any fatal complications from treatment.

Many in the animal rights community who are beginning to raise their voices against the use of animals in laboratory testing of new medical procedures are correct to urge researchers to treat animals humanely in their experiments. However, to suggest that animals should not be used at all for the advancement of biomedical research, is to essentially say that human life is equivalent

to that of animal life. Data for research must come from somewhere if modern medicine is to continue to advance itself, and it is better to use animals bred specifically for that purpose than to use other humans to garner that data.

Now, approximately seventeen years later, twelve years past her predicted life expectancy, my mother is about to celebrate my seventeenth birthday with me. Without prior research using animal subjects, my mother never would have received her life saving stem cell transplant. And I wouldn't even remember her face.

Works Cited

"About Autologous Blood Stem Cell Transplantation." - *Baylor Scott & White Health*. Web. 12 Mar. 2016.

"Autologous Transplantation." *Blood & Marrow Stem Cell Transplantation*:. Web. 12 Mar. 2016.

"How Do Stem Cells Find Their Way Home?" *Blood Journal*. Web. 12 Mar. 2016.

"Result Filters." *National Center for Biotechnology Information*. U.S. National Library of Medicine. Web. 12 Mar. 2016.

"A Direct Measurement of the Radiation Sensitivity of Normal Mouse Bone Marrow Cells." *Radiation Research: Official Journal of the Radiation Research Society*. Web. 12 Mar. 2016.