



Sally Temple, PHD

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Success Magazine: Sally, what does success mean to you?

Sally Temple: Professionally, making discoveries that help lead to repair and regenerate tissues and cells damaged in the central nervous system—the retina, brain and spinal cord—and providing a work environment that is productive, creative, and enjoyable. Our motto is “family first.” Personally, success is having a happy marriage and happy, successful kids.

SM: How did you get started in this field of stem cell research?

ST: I obtained my PHD in the study of brain development and how it forms diverse tissues. Most organs have definite cells specific to their type of cell, but the brain is different in its diverse types of cells. As a cell biologist, I accepted the challenge to contribute to finding out how the brain develops. I decided to break it down into individual units as scientists interested in development of the blood had already done. At the University of Miami in 1989, as a post doctorate fellow, I discovered that the brain contained a type of stem cell, which we called neural or nervous system stem cells. These cells are different from embryonic stem cells found in the early embryo that can make all the cells in the body. Neural stem cells normally produce cells only in the nervous system.

SM: What is your current study emphasis?

ST: We are studying how neural stem cells generate the numerous, diverse cell types of the adult central nervous system.

These studies may lead to therapies for neurodegenerative disorders, including macular degeneration, Parkinson's disease, Alzheimer's disease, for spinal cord injuries, or brain cancer.

SM: As a leader in the field of stem cell research, what makes one want to work for your institute and become part of your team?

ST: NYNSCI is dedicated to stem cell research for the nervous system, and the people who work with me embrace this goal. We think creatively and draw in strong collaborators, from local institutes, and from other US institutes and internationally, who strengthen our approach. The atmosphere here is fun but hard-working, and we cooperate as a team towards our various goals.

SM: What other areas are you researching?

ST: We are constructing a consortium of researchers in retinal repair. We have actually extracted stem cells from the adult human retina from eye bank tissue that can be used to progenerate cells for repair of macular degeneration.

SM: How will you bring your studies to fruition so that they can be used in the open market?

ST: We have to bring the academic and the private sector together. Such co-operations are necessary to bring our findings to the general public, to save lives and help people. An example of this is Stem Cells Inc., a California-based company that has taken basic

research on neural stem cells towards the first clinical trial using human neural stem cells. They are using these for Batten disease, which is a terrible disease of the nervous system where children die as toddlers with no cure in sight. The FDA is brought in to monitor the progress of the trial. In this case, they implant a few new neural stem cells creating and replacing enzymes that are missing.

SM: Where do we use stem cells currently?

ST: Bone marrow transplant uses stem cell transplants.

SM: Why is stem cell research so controversial?

ST: The major controversial stem cell research is when researchers want to use the blastocyst stage of the early human embryo to make embryonic stem cell lines. These cells have the potential to evolve into any type of cell in the body and carry on its specific function. They can divide without limit and because of their ability to make all cell types, including liver, kidney, pancreas, skin, brain etc, many scientists are interested in developing these lines for a variety of human diseases. The problem is that some feel that the destruction of human embryos for research is not an option that should be pursued, even if the embryo is a frozen blastocyst from IVF that will not be implanted and will be discarded. However most stem cell research is not controversial - It is important to understand that there are many different types of stem cells, including the neural stem cell and bone marrow.

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SM: What alternatives can be used instead of embryonic stem cells for research?

ST: One possibility is to use a new stem cell type originally discovered in Japan called an ‘induced pluripotent stem cell’ or iPS that can be made from adult cells such as skin. The formation of these cells requires genetic engineering, but scientists are trying to avoid this. An alternative is to use other stem cells that have some ability to make different cell types, but not all. For example, the retinal stem cell we have discovered appears to be able to make more cell types than we imagined initially. The body might contain other hidden stem cells with the ability to make new tissues, and we can continue to explore these.

SM: What is the difference between retinal stem cells and embryonic stem cells?

ST: Retina stem cells are adult stem cells and are from human patients. They proliferate in tissue culture, but to a limited extent. At present they do not form cancers like teratoma or dangerous cells. The retina stem cells may be useful to create new cells for repair of select damaged tissues in the body. Embryonic stem cells can generate all tissues of the body, but this is a double-edged sword – when they are implanted they could make teratomas or other growths, this is a fear that delays FDA approval of embryonic stem cell clinical trials.

SM: What is the moral issue with embryonic stem cells?

ST: Destruction of the embryo. The human engineering issue and other ethical issues are still at hand.

SM: What is the scientific point of view?

ST: There is a great advantage to using adult stem cells and embryonic stem cells for the creation of new cells that will help in the repair of spinal cord injuries and other neural related diseases such as Parkinson's disease, Alzheimer's, disease, ALS and macular degeneration. It is important to use human cells for testing

because the models such as mouse cells are different. Ideally, in future therapies, we want to use cells that are patient matched to the individual to prevent tissue rejection.

SM: How can this subject be broached?

ST: When you see one of your loved ones experiencing one of these devastating illnesses, you want to try to find a remedy and cure through any means. As with many things in life, we might not care about the issues until they affect us personally. My mother has macular degeneration so I want to do anything and everything I can to ease her pain and find a cure. I have wonderful friends who are

SM: How do you figure this out?

ST: We are testing on mice now, not humans. But we can use neural and retinal stem cells to make disease models. We are just beginning to take adult human neural cells from other regions of the nervous system, to characterize these to find new ways to screen for drugs that keep neural cells alive and prevent degenerative diseases.

SM: What are your short term goals?

ST: We have two projects where we are working toward our end-goals now. One is to develop a model for macular degeneration. We have a prototype and we are preparing to publish our findings soon. Another is to develop a new treatment for spinal cord injury, which we have promising results for.

SM: What are your long term goals?

ST: Nervous system repair. We want to take stem cells from the patient, improve them, and then put them back into the patient as their own so that the new tissue won't be rejected.

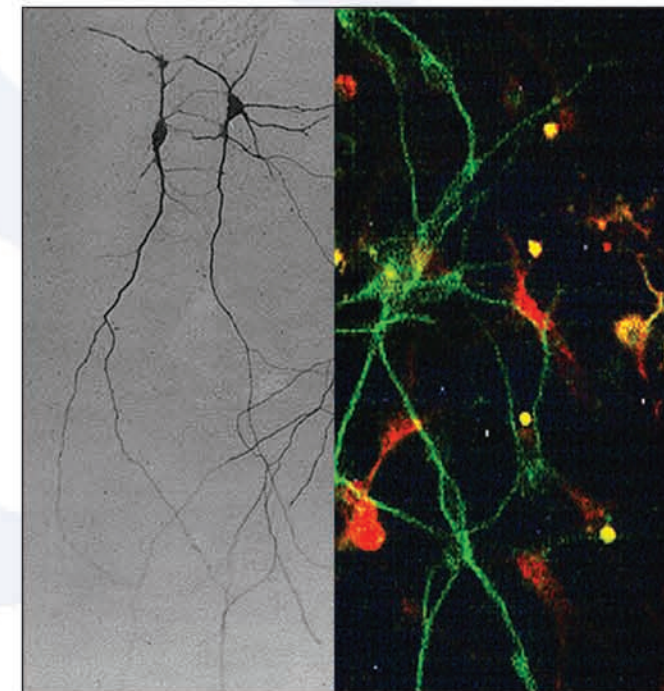
SM: Outside the States, stem cell research has no boundaries. How does that affect your work?

ST: You must have respect for boundaries. There is a growth of “institutes” that are promising miracle cures with stem cell research.

They are preying upon the vulnerable without any evidence or regulations. The FDA is slow to approve new drugs and treatments, but they do protect against scoundrels and unknown problems.

SM: In one word describe yourself.

ST: Busy. I love ideas. I love exciting and inspiring projects.



spinal cord injured, or have Parkinson's disease or multiple sclerosis, and I am working hard for them. When we find something that can help people and heal them, we want to be able to give back. We are on the threshold of a new era in medicine. Once we find the way to use these stem cells safely, we can not only use the findings for repair but also for prevention of diseases by creating disease models in tissue culture.

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