

# The Exciting Promise of Stem Cells

by Dr Deva Khalsa VMD



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**All creatures, great and small, were chock full of stem cells at one point in their life cycle. During their blastocyst stage (a few days after conception, before the embryo attaches to the uterine wall) they were filled with self-replicating embryonic stem cells, which would soon differentiate into all the cells and organs of their body.**

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Adult stem cells, which can be harvested from many tissues including bone marrow or fat, are called “multipotent” because, at this stage of medical research, they are more limited to which cells or tissues they can become. When any stem cell divides, each daughter cell has the potential to either remain a stem cell or become another type of cell with a more specialized function.

## Stem cell research is regenerative medicine

You can imagine how exciting the research in stem cell therapy is currently. In what is now called “regenerative medicine,” stem cells are now being used to treat a plethora of diseases in humans including diabetes, congestive heart failure, lung disorders, multiple sclerosis and stroke. The Bionic Man and Woman—not to mention Dog—are becoming reality.

In the vast majority of these cases, pluripotent embryonic stem cells are not being used. Rather, stem cells from bone marrow and fat are being used, creating multipotent stem cells. Multipotent cells can generate only a small number of cell types: bone, cartilage, lymphatic tissue and circulatory tissue. Since fat is very easy to harvest, many stem cell therapies are done using fat as a source of multipotent stem cells (I knew my extra fat would come in handy someday). For some years, multipotent stem cells have been used for arthritis, joint problems and regeneration of cartilage. Many veterinarians are now doing stem cell therapy for both dogs and cats.

At Colorado State University, Dr Steven Dow, Director of the Center of Immune and Regenerative Medicine, is doing a great deal of veterinary stem cell research. Stem cells from a dog’s fat are isolated, then adhered to plastic culture dishes while cells that are not stem cells are washed away. These progenitor cells are placed in a medium for weeks to multiply. These multipotent stem cells are then being used for some very promising research.

Right now, for example, Dr Dow is working on finding out whether stem cells can

regrow the bone lost when a bone tumor is surgically removed. They are also being tested for use against kidney failure in cats, liver disease in dogs, and inflammatory bowel disease (IBD) in cats. It’s been shown that stem cells have a definite anti-inflammatory effect, and diseases that have an inflammatory component—some liver conditions, IBD and kidney disease in cats, for instance—seem to be responding to the immunomodulatory effects of stem cell therapy

To introduce another angle of research: stem cells are living in protected niches in our dogs’ bodies (and our bodies, too) at this very moment. They’re even in your dog’s teeth! Stress in the body can stimulate them to come out of hiding and do necessary repair work. Scientists are working to see if methods such as stressing the cells by reducing oxygen content might make them able to differentiate into more varied and diverse cells and tissues.

## Stem cell therapy at your vet’s office

Dr Tracy Webb, a research scientist and veterinarian at the university, advises people to pay close attention to what kind of stem cell therapy they’re getting for their animals. She feels it’s important for



This is a bit of controversy surrounding the research with embryonic stem cells. In 2001, then president George W Bush signed an executive order banning government funding for stem cell research in the United States. In 2009, president Barack Obama revoked Bush's order in a new executive order approving stem cell research.

the public to be educated about what is going on in the field.

Dr Webb finds the immunomodulatory properties of stem cells very exciting in their potential to help treat many disease processes. The fact that these cells can redirect or alter the immune response to handle a problem in the body which the body's own cells have found unable to handle is pretty exciting to me, too.

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Most veterinarians don't have the facilities on hand to isolate and grow a specific cell line, so when your dog's fat is used to make stem cells a simpler procedure is

most often used. Stem cells are harvested together with many other kinds of cells, rather than isolated, then made to proliferate. Even so, many positive outcomes are being reported with this technique.

It's important to compare apples with apples when discussing stem cells. They can come from different tissues, including embryonic stem cells from the blastocyst, fat cells, bone marrow cells and even the umbilical cord. Their origin, at least at this point in stem cell research, affects what type of cells they can become and what they can do. The method of preparation will also determine how many stem cells in total are administered to your dog.

I was very excited after my first lecture on stem cells at the AHVMA several years ago. Research projects such as one where goats with their kneecaps totally removed grew them back after stem cells were administered had me over the top. As each year goes by, more research is being done in both veterinary and human medicine. Stem cells hold huge promise for answers and cures to many diseases. 🐾

#### CAN STEM CELLS CAUSE CANCER?

Every medical procedure has risks. A possible risk of some stem cell treatments may be the development of tumors or cancers.

When cells are grown in culture (a process called expansion), the cells may lose the normal mechanisms that control growth or may lose the ability to specialize into the cell types needed. Also, embryonic stem cells will need to be directed into more mature cell types or they may form tumors called teratomas.

As stem cell research continues, scientists will have a better grasp on the risks and benefits.



Over the last 25 years, Dr Khalsa has been incorporating homeopathy, acupuncture, Chinese herbs, nutritional advice, allergy elimination techniques such as NAET and also JMT into her approach. Visit Dr Deva at [doctordeva.com](http://doctordeva.com)