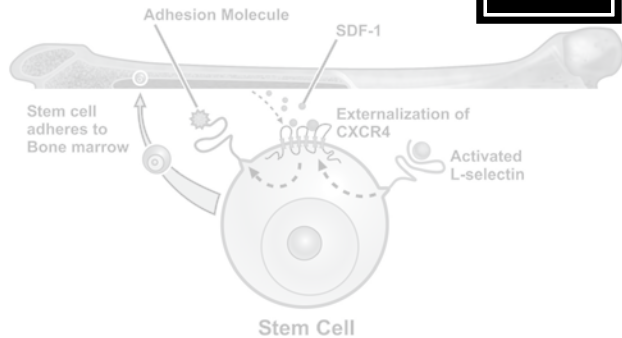


Overview

CHAPTER 1



Much has been written in the media about stem cells, but the objective information is often buried in so many layers of propaganda and political agendas that in spite of the excitement surrounding significant discoveries about stem cells, the average reader is generally left more confused. Reporters are often powerless in their ability to critically report the information, as the topic of stem cells can be rather complex. Thus, some news articles still claim that adult stem cells have little potential, while actual science clearly tells us that the future of stem cell research is in fact with adult stem cells. The purpose of this book is to provide sound and practical information about stem cells, putting the new discoveries in a context that can completely change the way we look at health and wellness.

In spite of all the media ‘information’, most people still cannot properly answer these simple questions: What is a stem cell? What is the difference between adult stem cells and

embryonic stem cells? How can they be used for treatment or general health? And more importantly, what is the natural role of stem cells in the body?

In Chapter 1, I provide a time line of the historical development leading to what we know today about stem cells. We begin with the first observation of bacteria under a microscope to the first proposal of the concept of a stem cell to the first observation of an actual stem cell, and finally we arrive at the recent breakthrough discovery that adult bone marrow stem cells constitute the natural healing system of the body.

The science is so new that many doctors do not, even today, know what adult stem cells truly are, how they work, and what their true potential is. I have heard doctors emphatically asserting that cells from bone marrow cannot possibly become cells of other tissues and organs, *and certainly not cells of the brain!* When I tell them that I can provide them with dozens of peer-reviewed studies published in reputable scientific journals, some of them immediately assume that I do not know what a peer-reviewed journal is. And I am not saying this to belittle doctors; it's simply that the science is so novel. Even today in medical school, students are taught that bone marrow stem cells are the precursors to blood cells, period. Bone marrow stem cells cannot become heart cells, and certainly not brain cells!

The first big discovery is that they CAN become other types of cells; the second discovery is that not only they can but they DO become cells of other tissues, and they do so naturally every day of our lives. The purpose of this book

is essentially to describe stem cells, their role in the body, their enormous potential, how they constitute our natural healing system, and what we can do to support their work in the body.

As with many discoveries in science, significant breakthroughs are made after the development of a tool that allows us to look at the world in a different way. For example, how were bacteria discovered? People had been suffering from infectious diseases for centuries, not knowing that the cause of those diseases rested in minuscule organisms. It was not until the invention of the microscope, which revealed the ubiquitous nature of bacteria, that science could link specific bacteria to the development of specific diseases. How did we discover the migration patterns of migratory birds? With the development of the GPS tracking device. By using this system to track the movement of one single bird, it was possible to see the unexpected distances covered. Likewise, the tool allowing breakthrough discoveries with stem cells is the development of a protein called Green Fluorescent Protein, isolated from a deep ocean jellyfish. The importance of this discovery is such that it was awarded the Nobel Prize in Chemistry in 2008. This protein, which I will cover in more detail in the following chapters, is like a tracking device allowing us to follow the movement of cells. The use of Green Fluorescent Protein suddenly made visible a phenomenon that had previously been invisible. It became possible to literally SEE a stem cell become a liver cell or a pancreatic cell or a heart cell.

But this was just the first chapter of a fabulous story that has only been fully revealed in recent years. Not only can stem cells become cells of other tissues, but they do so every day, on their own, as part of the body's innate natural renewal system. In brief, any time there is an injury in the body or a tissue is not functioning optimally, the affected tissue releases specific compounds that trigger the release of stem cells from the bone marrow. The affected tissue also secretes SOS molecules that attract stem cells. As stem cells flow in the blood circulation and travel through the capillaries of the affected tissue, the SOS molecules attract stem cells and trigger their migration across the capillary wall into the tissue. When stem cells arrive in the tissue, they multiply and then transform into cells of that tissue. This phenomenon takes place after a heart attack, a broken bone, a stroke, a skin wound... any injury to a tissue, even chronic degenerative processes taking place in the body over long periods of time.

In this whole process the key parameter is the number of circulating stem cells; more stem cells circulating in the blood means that more stem cells are available to migrate into tissues and carry out tissue repair. A number of studies have shown that people with a higher number of circulating stem cells have a lower risk of developing heart problems or health problems in general. Recently, low levels of stem cells in the blood have been linked to arthritis, some pulmonary diseases, rheumatism, kidney disease, diabetes, and even erectile dysfunction.

Simply increasing the number of circulating stem cells in the blood may be a way of preventing the development of various health problems and, in some cases, even reversing degenerative problems and repairing damaged tissues. As a whole, this new information on adult stem cells points in a fascinating direction. Diseases are generally seen as the consequences of the degeneration of organs and tissues, and the common therapeutic approach essentially consists of compensating for the lack of organ function. For example, diabetes is compensated for with insulin injection, cardiovascular problems are compensated for with beta blockers and blood pressure medications, Parkinson's with dopamine precursors, kidney failure with hemodialysis, etc. The problem is never resolved – one simply learns to live with it.

When we realize that health is not solely determined by the degeneration of tissues but also by the ability to regenerate tissues, we are then provided with a unique opportunity to restore health. Health is a balance between degeneration or the result of normal daily cell loss, and regeneration or the result of repair carried out by migrating stem cells. If the rate of degeneration is higher than the rate of repair, *unwellness* ensues; if the rate of repair exceeds the rate of degeneration, one regains and experiences *wellness*. Therefore, if there is a way of increasing the number of circulating stem cells, or more generally supporting stem cell function, then we have a promising way of promoting health and healing by tapping into the potential of our own stem cells.

This book ends by looking at ways in which we can support stem cell function. In conclusion, we review how this new information pertaining to stem cells can literally change the way we view health, wellness, and disease formation, and ultimately how we practice medicine.