Smart Life Forum

presents

Dominique Charron, M.D., Ph.D.
on
Autologous White Blood Cells: Towards a Younger Immunity

Thursday August 16, 2007
at 7:00 PM
Cubberly Center, Room H1
4000 Middlefield Road
Palo Alto, CA

Future Speakers:

September 20: Lyn Henshew, M.D., *On Reducing Toxins for Better Health*

October 18: Abraham Kryger, M.D., D.M.D. *Listen to Your Hormones*
A Doctor"s Guide to Sex, Love and Long Life

White blood cell banking for healthy individuals is a dynamic new service in the United States created to preserve a healthy immune system for future medical therapies.

Short Presentation: Steve Fowkes talk will be on Deprenyl, also known as Seligiline, or Eldepryl. He will cover its anti-aging, pro-sexual and cognitive enhancing benefits, and why middle aged and older men get more benefits from it than women.

Meet Dominique Charron, MD, PhD

Visiting the Monterey Peninsula from Paris, France, Dominique Charron is one of the World's renowned Immunologists and currently holds several positions including the following:

- Professor of Medicine – Immunology, University of Paris
- Chairman – Department of Immunology / Histocompatibilty – Saint Louis Hospital AP- HP
- Head of Translational research in Hematology, Oncology, Transplantation CIB-HOG
- Director of Research INSERM Medicine
- President: European Foundation of Immunogenticits (efiweb.org)
- President of the Scientific Advisory Board for BioBancGroup

Previous positions include Chairman (1992 – 1996) of the 12th International Histocompatibility Work-shop and Conference, President of International Histocompatibilty Council (1996 – 2002), and a Scientific Board Member of ANRI (Antony Nolan Research Institute).

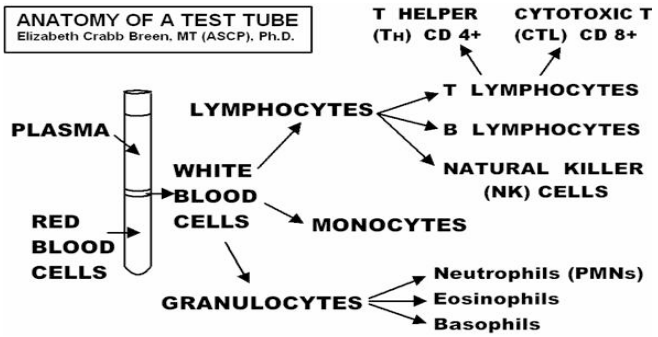
His primary education was spent at Paris University, where he received his MD and PhD between 1972 – 1978. Dr. Charron went on to do his post doctoral work in Immunology at Stanford University between 1978 – 1991. An accomplished lecturer at conferences around the world, he has received several honors including most recently the Ceppelini Lecture award (2001) and the Grand Prix Claude Bernard for Medical Research (2002)

Dr. Charron will be speaking on the subject "Autologous White Blood Cells: Towards a Younger Immunity". During his presentation, Dr. Charron will give the history of blood cell use in medicine, an overview on human aging and how it affects your immune system, white blood cell infusion, and the benefits of storing your healthy white blood for deferred medical use.

MAIN PRESENTATION

White Blood Cells: Guardians of Your Health

White blood cells are a component of whole blood and have three primary functions. They help fight infection, provide protection from foreign particles that enter the blood stream, such as allergens, and fight against mutated cells, such as cancer. They are the foundation of your immune system.



There are three types of immunity:

Innate Immunity: Everyone is born with innate (or natural) immunity, a type of general protection that humans have. Many of the germs that affect other species don't harm us. Innate immunity also includes the external barriers of the body, such as the skin and mucous membranes (those that line the nose, throat, and gastrointestinal tract), which are our first line of defense in preventing diseases from entering the body. If this outer defensive wall is broken (such as a cut or burn), the skin attempts to heal the break quickly and special immune cells on the skin attack invading germs.

Adaptive Immunity: We also have a secondary protection called adaptive (or active) immunity. This type of immunity develops throughout our lives. White blood cells hold your immune "memory" and are programmed with the information necessary to fight infection and disease. Adaptive immunity involves the lymphocytes and, over time, develops an extensive repertoire of these programmed cells as we are exposed to diseases or immunized against diseases through vaccination.

Passive Immunity: Passive immunity is "borrowed" from another source and it lasts for a short time. For example, antibodies in a mother's breast milk provide an infant with temporary immunity to diseases that the mother has been exposed to. This can help protect the infant against infection during the early years of childhood.

Recently, immunologists have identified **dendritic cells**, the most powerful cells able to process and present antigens to lymphocytes. Their use in adaptive immunotherapy is fast developing.
As you age, your body's ability to fight off infections and other health problems diminishes significantly. The immune system of older adults does not function as efficiently as in younger people. This is known as immunosenescence. Immunosene-scence is characterized not only by a defective T cell response, but also by changes in the number and function of other cells of both the innate and adaptive immune system.

Aging compromises the function of the immune system (1), enhances susceptibility of the elderly to infections and cancer, and decreases the response to vaccines. How to prevent or overcome immune senescence is a major topic of basic and clinical immunology research

It is well documented that the capacity of an individual to develop high affinity antibodies decreases with age leaving less functional low affinity antibodies to interact with pathogens. Thus, immunological memory acquired early in life is maintained into old age. In contrast, the impaired immunological memory generated later in life is dependant upon older, functionally compromised naïve T cells. (2)

Current <u>and Future</u> Use of White Blood Cell Therapies

Autologous blood transfusions have been used successfully for many years. During leukemia treatments, white blood cells are collected and re-introduced either immediately or after cryogenic storage (DLI). Ongoing clinical protocols using white blood cell transfusion are already developed and used for the treatment of chronic myelogenous leukemia (CML), acute leukemia, chronic lymphocytic leukemia (CLL), myelodysplasia (MDS), Hodgkin disease, non-Hodgkin lymphoma (NHL), and multiple myeloma as well as some severe infectious diseases.

Adaptive immunotherapy using white blood cells has proven efficatious in major cancers such as melanoma and prostatic cancers. Recently, a groundbreaking report by the National Institutes of Health unveiled a new approach to attack cancer tumors using white blood cells. A paper published in the leading scientific journal *Science* explained that white cells have the ability to specifically recognize melanoma and that such recognition is key to their ability to attack malignancies (3).

It is also now well established that tumors arising in mice (lacking T cells and with T cells impaired in their capacity to secrete gamma-interferon) can be treated with autologous white blood cells from immunocompetent mice. This demonstrates the protective role of the immune system against tumors. The immune system, once "educated" by exposure to an antigen, retains memory necessary to fight infections and to respond to vaccination.

Cryopreservation – A Unique and Promising Bio-Resource:

Cryopreserving autologous white blood cells is a unique and promising bio-resource. Cryopreservation of white blood cells is now a routine procedure that allows their long-term banking for future use. This process is now well established. It is also implemented for the harvesting and preservation of cord blood stem cells obtained at birth for future use. A similar procedure has been developed for the preservation of peripheral white blood cells. In addition, the isolation and preservation of bone marrow hematopoietic stem cells mobilized into the peripheral blood is now being developed. This means another source of autologous immune cells or hematopoietic stem cells is available for those individuals whose cord blood stem cells have not been preserved. It is envisioned that, in the not-too-distant future, white blood cells and/or hematopoietic stem cells will be stored for all people who might face infectious diseases or cancer late in life when the patient's immune system is compromised. These cells have advantages:

1. Cryopreserved autologous white blood cells can be obtained from the patient before the effects of aging and disease develop. These cells, obtained from young adults, have a more diverse immune repertoire than those found later in life and are more likely to target, recognize, and destroy pathogenic organisms and tumors.

2. Cryopreserved autologous cells obtained from healthy individuals are safer and more effective (4). The risk of infusing contaminating pathogens or circulating malignant cells, present in the blood cells at the time of diagnosis (including the very rare but deadly cancer stem cells), can be eliminated by thawing cells cryopreserved years before, when the individual was disease free. BioBancUSA has established the methods to collect and preserve white blood cells from healthy individuals that can be used to treat infectious and neoplastic diseases that develop later in life.

Collection and Storage

The collection process to store your white blood cells is identical to giving blood. A whole unit of blood (450 ml) is taken using a functionally closed system. The unit of blood is then volume reduced by removing the red blood cells and plasma, leaving 20 ml of white blood cells. This volume represents an average of between 1.3 – 2 billion white blood cells.

The cells are then carefully prepared and frozen in a molded freezing bag to provide uniform freezing of the white blood cells. The bag is then placed in a protective aluminum cassette, frozen at a computer controlled rate and stored in liquid nitrogen at -196 degrees C.

Studies from 1998 indicate stem cells have proven viable after 15 years of cryopreservation using this technology. However, a number of experts believe these cells can be preserved indefinitely since the molecular state of the cells has been suspended due to freezing.

1 Hodes RJ. 2005. Aging and the immune system. Curr Opin Immunol. 17(5):455-6
2 Gruver A, Hudson L, Sempowski G. 2007. Immunosenescence of ageing.J Pathol. 211(2):144-156
3 Morgan RA, Dudley ME, Wunderlich JR, et al.: Cancer Regression in Patients After Transfer of Genetically Engineered Lymphocytes. Science 2006: 314(5796):126-9.
4 Charron D. 2007. Autologous white blood cells transfusion: Towards a younger immunity
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