Editorial

iMedPub Journals
http://www.imedpub.com

Journal of Autoimmune Disorders
ISSN 2471-8513

2015
Vol. 1 No. 1:8

Regenerative Medicine Applications in Autoimmune Disorders

Vasiliki E. Kalodimou

Director at Flow Cytometry-Research & Regenerative Medicine Department, IASO-Maternity & Research Hospital, Athens, Greece

Received: October 09, 2015; **Accepted:** October 25, 2015; **Published:** November 03, 2015

Corresponding author:
Vasiliki E. Kalodimou

kalodimou@yahoo.gr

Director at Flow Cytometry-Research & Regenerative Medicine Department, IASO-Maternity & Research Hospital, Athens, Greece.

Tel: 30 210 6185 203

Citation: Kalodimou VE. Regenerative Medicine Applications in Autoimmune Disorders. J Autoimmun Disod. 2015, 1:1.

Editorial

An autoimmune disorder occurs when the body's immune system attacks and destroys healthy body tissue by mistake, while the white blood cells in the body's immune system can't protect against this harmful substances, e.g. toxins, cancer cells, bacteria, viruses, and blood and tissue from outside the body.

The immune system control mechanism produces antibodies enable to destroy the antigens contained to these harmful substances but in the presence of an autoimmune disorder the immune system does not distinguish between healthy tissue and antigens and intrigue a reaction that destroys normal tissues[1].

The exact cause of autoimmune disorders is still unknown. Theories include:

1. Microorganisms such as bacteria, viruses or drugs may trigger changes that confuse the immune system. This may happen more often in people who have genes that make them more prone to autoimmune disorders.

2. An autoimmune disorder may affect one or more organ or tissue types.

3. A person may have more than one autoimmune disorder at the same time.

There are more than 80 types of autoimmune disorders include multiple sclerosis, type 1 diabetes, lupus, rheumatoid arthritis, uveitis, scleroderma, grave's disease and chronic thyroiditis, among others.

The leading cause of death and disability in the United States is the infection with an autoimmune disorder with 23.5 million Americans affected each year, while the NIH estimate the direct healthcare costs to treat autoimmune disorders is around $100 Billion Annually [2].

Treating those disorders is very difficult because they can affect any part of the body with varying symptoms. Immunosuppression medication is a common form of treatment as it decreasing the immune response but also suppresses normal immunity, leaving the body at risk for infections. Inflammation is another side effect, even when the inflammation can be acute a chronic inflammatory disorder could be developed. These disorders result in abnormal inflammation and cause more destruction of healthy tissue, chronic pain, redness, swelling and immobility [3-4].

Regenerative medicine community focuses in developing treatments for autoimmune disorders and inflammation. The mechanism of action for these cell based therapies is still under investigation; however, experimental results suggests that through cellular interaction between therapeutic cells and the patient's immune system, including anti-inflammatory T-cell responses , suppression and immunomodulation can be achieved. Mesenchymal stem and progenitor cell populations derived from a variety of adult tissue sources (e.g. adipose tissue) are under investigation as possible treatments for those disorders.

The adipose derived stem cells (ADSC's) are an exceptionally rich source of mesenchymal stem cell. Originated in stromal vascular fraction (SVF), a protein rich segment from processed adipose tissue. SVF contains a mononuclear cell line (autologous mesenchymal stem cells), endothelial cells, red blood cells, macrophage cells, and important growth factors that facilitate the stem cell process and promote their activity [5].

Unfortunately, not all autoimmune disorders respond to stem cell therapy, and each patient must be assessed individually to determine the potential for optimal results from this regenerative medicine process.

Cutting edge approaches have being studied around the world for most of them, e.g.: [6-10].

Rheumatoid arthritis

Rheumatoid arthritis is an autoimmune inflammatory disease, affects 1 out of 100 people worldwide with little variation between countries and characterized by joint inflammation, usually occurs in joints on both sides of the body. Early therapy includes immunosuppressive drugs and anti-inflammatories because it appears to delay joint destruction. More recently, biologic agents have been added to regimens that include TNF inhibitors, WBC modulators, and growth factor inhibitors.

Adipose derived mesenchymal stem cells have been shown to have potent anti-inflammatory and repair-promoting capabilities, and show promise for use for a wide range of therapeutic applications. The results from the first clinical trial are encouraging. Further clinical studies are now needed to explore and to better understand the use of these cells as a treatment for rheumatoid arthritis

Lupus

Lupus (systemic lupus erythematous or SLE), most common type, is an autoimmune disease in which the immune system became hyperactive and mistakenly attacks healthy tissues, especially in the joints, leading to inflammation, pain, swelling, and tissue destruction.

Until now there is known cure for SLE using anti-inflammatory medications and immune-suppressants for treatment.

Adipose mesenchymal stem cell therapy is a new alternative treatment to help manage the symptoms of lupus. Recent research in the advancement of adult mesenchymal stem cell therapy has shown that restoration of damaged cells through this treatment is possible. Results of several early clinical studies of stem cell transplantation for lupus have been promising. Although there is no known cure for lupus at this time, ADSC's is an alternative way to fight back against the harmful and painful effects of lupus. Adipose stem cell therapy helps manage symptoms and reduce the effects of further damage. Repair and regeneration of diseased cells seems to be possible.

Myasthenia gravis (MG)

Myasthenia gravis (MG) is an autoimmune neuromuscular disease leading to fluctuating muscle weakness and fatigability. Muscular fatigue is associated with speech & ocular problems, swallowing, and breathing. MG is associated with other auto-immune conditions, such as thyroid disease, lupus, and diabetes.

The treatment available is with the use of immuno suppressants and acetylcholinesterase inhibitors, while thymectomy is also a treatment option for the disease.

Lately, researchers worldwide have performed studies on animals to see if stem cells really do impact an auto-immune condition like myasthenia gravis. In 2010, The Scandinavian Journal of Immunology reported that when mice with myasthenia gravis were treated with hMSC (mesenchymal stem cells) there was a significant improvement in their condition. Research on humans produces positive results as well.

Hepatitis

Autoimmune hepatitis is a chronic disease in which the body's immune system attacks the normal components, or cells, of the liver and causes inflammation and liver damage while the patients experience loss of appetite, itching, fatigue, and abdominal distension. It could be occurring with other auto-immune conditions such as Crohn's, lupus, Graves's thyroid disease and scleroderma.

The available treatment is with corticosteroids but the hepatitis may cause cirrhosis and eventually lead to liver failure.

Adipose stem cell therapy could be an alternative treatment to help manage the complications of Hepatitis. Adipose stem cells have the potential to replace countless cells of the body and may heal the body.

Crohn's disease

Crohn's disease is an auto-immune disease in which the person's own immune system attacks the gastrointestinal tract and affects 500, 0000 people per year in North America.

Affect any part of the gastrointestinal tract from mouth to anus, causing a wide variety of symptoms, such as bloating, vomiting, diarrhea, abdominal pain, skin rashes, arthritis and weight loss.

Available treatment includes steroids, antibiotics, and anti-inflammatories.

Adipose tissue derived stem cells have two qualities that make them a promising candidate for treating Crohn's because of their ability to regeneration and their anti-inflammatory response. Researchers all over the world studying deeper into treating Crohn's with ADSC's while long-term follow-up studies are assessing the longevity of ADSC's therapy to provide complete healing.

The results till know are promising and in time may point to a viable stem cell therapy for Crohn's that can reset the immune system and repair damaged tissue.

Conclusion

Concluding evidence suggests the requirement for further in vitro and in vivo studies to achieve safety in clinical trials. Furthermore, the immunological and regenerative mechanism needs to be fully elucidated to better understand the mechanisms of autoimmune disorders. We need to rely on innovative solutions and technologies that mitigate chronic healthcare related costs, lessen chronic care and improve patients' quality of life.

References

1 MedlinePlus, "Autoimmune Disorders," May 29, 2011, U.S. National Library of Medicine website.

2 Johns Hopkins Health System, "What is Autoimmunity?: Broad Spectrum of Autoimmune Disease," Johns Hopkins University School of Medicine website.

3 U.S. Department of Health and Human Services Office on Women's Health, "Autoimmune Diseases Fact Sheet," April 14, 2010, womenshealth.gov website.

4 American Autoimmune Related Diseases Association (AARDA), Inc., "Autoimmune Disease Fact Sheet," AARDA website.

5 Kalodimou VE (2015) A Handbook to Mesenchymal Stem Cells in Regenerative Medicine, Specg. Co

6 Passweg J, Tyndall A (2007) Autologous stem cell transplantation in autoimmune diseases. Semin Hematol 44: 278-285.

7 Aldhous P (2007) Stem cell genes may provide medicine's dream ticket. New Scientist.

8 Atala A (2007) Engineering tissues, organs and cells. J Tissue Eng Regen Med 1: 83-96.

9 Parekkadan B, Milwid JM (2010) Mesenchymal stem cells as therapeutics. Annu Rev Biomed Eng 12: 87-117.

10 Hwang NS, Zhang C, Hwang YS, Varghese S (2009) Mesenchymal stem cell differentiation and roles in regenerative medicine. Wiley Interdiscip Rev Syst Biol Med 1: 97-106.