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An Overview on Histocompatibility Antigen: HLA-G

Teela Sande*

Department of Cancer, University of Leicester, Leicester, UK

***Corresponding author:** Teela Sande, Department of Cancer, University of Leicester, Leicester, UK, E-mail: teela.sand@leicestr.ac.uk

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Introduction

Major histocompatibility class I or MHC class, I can be categorized into two types: classical and non-classical. HLA-A, -B, and -C proteins constitute the classical MHC class. The non-classical MHC class I proteins are HLA-E and HLA-G. By presenting foreign antigens to CD8+T-cells, HLA-A, -B, and -C result in cytotoxicity of infected cells. The classical HLAs A, B, and C are largely involved in immunoresponse pathways, whereas HLA-G is involved in immunosuppression pathways. Due to alternative splicing, HLA-G exists in 7 isoforms (HLA-G1-HLA-G7). HLA-G1, a membrane-bound isoform of HLA, and HLA-G5, a soluble isoform, have been studied extensively for their immunosuppressive effects.

Immune cells of both the innate and adaptive immune systems exhibit tolerogenic properties induced by HLA-G. An inhibitory receptor known as HLA-G binds to the surface of APCs, NK cells, T-cells and B-cells, such as ILT-2, ILT-4, and KIR2DL4. Comparatively to the classical MHC class I molecules, ILT2 and ILT4 bind to HLA-G molecules preferentially. ILT2 inhibitory receptors were found to be expressed by APCs, NK cells, T-and B-cells, whereas ILT4 was found to be expressed primarily by myeloid APCs. In addition, HLA-G binding to ILT4 of myeloid APCs inhibits the maturation of APCs and converts them to regulatory tolerogenic cells incapable of activating T cells. In addition, HLA-G binding to ILT4 of myeloid APCs inhibits the maturation of APCs and converts them to regulatory tolerogenic cells incapable of activating T cells. Trogocytosis occurs when membrane proteins or membrane patches from one cell attach to another. Trogocytosis occurs when membrane proteins or membrane patches from one cell attach to another. HLA-G expression leads to long- term vulnerable repression in a number of ways, making HLA-G a veritably unique MHC class I protein that's able of both localized and global immune suppression when expressed.

As well as being detected in pregnant women, SHLA-G is detected during infectious diseases such as hepatitis, hepatitis B, and HIV. Vaccines against rabies, influenza, and herpes B virus express HLA-G on their cells. Human cells infected with herpes B virus show increased surface expression of HLA-G, but HSV-1 infected cells do not show the same level of HLA-G expression. According to unpublished data, individuals with the herpes B virus but not with HSV had HLA-G in their serum (unpublished data). Based on these findings, serum HLA-G may serve as a useful biomarker to distinguish HSV-1-infections from herpes B-infections in humans. Even though HLA-G may also be induced during other infectious diseases, it is a critical biomarker in the development of confirmatory diagnostic tests. HLA-G can be induced by other infectious diseases, but it can also be used as a biomarker for confirming diagnoses.

In cases of early detection of cancer, confirmatory diagnosis is crucial for an appropriate and effective treatment. There has also been evidence of HLA-G expression in patients suffering from ovarian cancer, cervical cancer associated with the human papilloma virus, and melanoma. By understanding the expression of HLA-G in relation to the stage of cancer progression, diagnostic tools for early cancer detection and staging can be developed. Cancer detection early is an indispensable tool in preventing cancer metastasis.

Conclusion

In view of HLA-G's immunosuppressive nature, it can be altered to prevent immune suppression and promote robust immune responses to fight a variety of human diseases, making it a potential target for therapeutic development. HLA-G is also capable of suppressing an unusually active immune system, as in multiple sclerosis, an autoimmune disorder due to its immunosuppressive properties.