

Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications

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Abstract

HIV infection leads to progressive immune dysfunction characterized by T cell exhaustion, a state of functional impairment and loss of effector functions. L-selectin, a key adhesion molecule involved in immune cell trafficking and activation, has emerged as a potential regulator of HIV-related immune exhaustion. This review provides an overview of the current understanding of L-selectin in HIV pathogenesis, focusing on its role in modulating immune cell dynamics and function during chronic infection. We discuss the mechanisms by which L-selectin contributes to the development and maintenance of immune exhaustion in HIV, including its impact on T cell migration, activation, and survival. Furthermore, we explore the therapeutic potential of targeting L-selectin pathways to mitigate immune exhaustion and restore immune function in HIV-infected individuals.

Keywords: *L-selectin, HIV, immune exhaustion, T cell dysfunction, adhesion molecules, immune therapy.*

Introduction

The advent of antiretroviral therapy (ART) has transformed HIV infection from a life-threatening disease to a manageable chronic condition. However, despite significant advancements in treatment, many HIV-infected individuals still experience progressive immune dysfunction characterized by the depletion of CD4⁺ T cells and the development of T cell exhaustion. T cell

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exhaustion is a state of dysfunction where T cells lose their effector functions and proliferative capacity, rendering them ineffective in controlling viral replication and clearing infected cells. Among the various factors implicated in T cell exhaustion during HIV infection, adhesion molecules have emerged as key regulators of immune cell dynamics and function. Adhesion molecules are cell surface proteins that mediate interactions between immune cells and their microenvironment, playing a crucial role in immune cell trafficking, activation, and survival. L-selectin, also known as CD62L, is one such adhesion molecule that has garnered increasing attention for its potential role in HIV-related immune exhaustion. L-selectin is expressed on the surface of most leukocytes, including T cells, and is involved in mediating their recruitment to lymphoid tissues and sites of inflammation.¹⁻²⁵

The involvement of L-selectin in immune cell trafficking and activation suggests that dysregulation of L-selectin expression or function may contribute to T cell dysfunction and exhaustion during chronic HIV infection. Indeed, emerging evidence indicates alterations in L-selectin levels and signaling in HIV-infected individuals, which may impact T cell migration, adhesion, and survival. Moreover, dysregulated L-selectin-mediated immune responses may exacerbate chronic immune activation and inflammation, further driving T cell exhaustion and disease progression. Understanding the mechanistic links between L-selectin and immune exhaustion in HIV infection is essential for identifying novel therapeutic targets and developing interventions to restore immune function. In this review, we aim to provide an overview of the current understanding of L-selectin in HIV-related immune exhaustion.²⁶⁻³⁸

L-selectin in Immune Cell Trafficking

Immune cell trafficking is a highly regulated process crucial for effective immune surveillance and response. L-selectin, a cell surface adhesion molecule expressed on most leukocytes, including T cells, B cells, and monocytes, plays a pivotal role in orchestrating this intricate dance of immune cells within the body. L-selectin facilitates the initial tethering and rolling of leukocytes along the endothelial surface of blood vessels, a crucial step in their extravasation from circulation into tissues. At the heart of L-selectin's role in immune cell trafficking lies its interaction with specialized endothelial ligands, such as peripheral node addressin (PNAd), expressed on high endothelial venules (HEVs) within lymphoid organs and inflamed tissues. This interaction enables immune cells expressing L-selectin to adhere to the endothelial surface and subsequently migrate into lymphoid tissues, where they can mount appropriate immune responses against pathogens, including HIV.³⁹⁻⁵¹

During HIV infection, alterations in L-selectin expression and function may have profound implications for immune cell trafficking dynamics. HIV-induced inflammation and immune activation can lead to upregulation of endothelial adhesion molecules and altered expression of L-selectin on circulating leukocytes. Consequently, dysregulated L-selectin-mediated interactions between leukocytes and endothelial cells may result in aberrant immune cell recruitment and retention within tissues, contributing to immune dysfunction and disease progression. Moreover, L-selectin's role in immune cell trafficking extends beyond lymphoid tissues to sites of

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inflammation and tissue injury, where it facilitates the recruitment of effector cells to combat invading pathogens. However, chronic inflammation and tissue damage associated with HIV infection can disrupt L-selectin-mediated immune cell trafficking, impairing the ability of immune cells to effectively surveil and respond to viral challenges.⁵²⁻⁷⁰

L-selectin in T Cell Activation and Survival

Beyond its role in immune cell trafficking, L-selectin serves as a crucial modulator of T cell activation and survival, influencing the functional competence and longevity of T cell responses. T cell activation is a tightly regulated process initiated upon recognition of antigen-presenting cells (APCs) presenting cognate antigens via the T cell receptor (TCR). L-selectin, expressed on the surface of naive T cells, contributes to the formation of stable contacts between T cells and APCs, facilitating antigen recognition and TCR signaling. Upon engagement with its ligands, L-selectin triggers intracellular signaling cascades that potentiate T cell activation and effector function. This includes activation of protein kinase C (PKC) and mitogen-activated protein kinase (MAPK) pathways, leading to the upregulation of activation markers and the production of cytokines critical for T cell effector function. Additionally, L-selectin signaling enhances T cell receptor (TCR) signaling strength, amplifying downstream signaling events essential for T cell activation and proliferation.⁷¹⁻⁹⁰

Furthermore, L-selectin signaling promotes T cell survival by modulating apoptotic pathways and promoting anti-apoptotic signaling. Studies have demonstrated that engagement of L-selectin with its ligands on stromal cells or endothelial cells can activate phosphoinositide 3-kinase (PI3K)/Akt pathway, leading to the inhibition of apoptosis and the promotion of T cell survival. This pro-survival signaling cascade mediated by L-selectin is critical for maintaining T cell viability during the immune response. In the context of HIV infection, dysregulated L-selectin-mediated T cell activation and survival may contribute to the development of T cell dysfunction and exhaustion. Chronic immune activation and inflammation associated with HIV infection can lead to aberrant L-selectin signaling, perturbing T cell activation thresholds and promoting T cell exhaustion. Moreover, HIV-induced alterations in L-selectin expression and function may impair T cell survival pathways, rendering T cells more susceptible to apoptosis and immune dysfunction.⁹¹⁻¹⁰¹

Understanding the role of L-selectin in T cell activation and survival during HIV infection is essential for unraveling the mechanisms underlying T cell dysfunction and exhaustion. Targeting L-selectin pathways to modulate T cell activation thresholds and promote T cell survival holds promise as a therapeutic strategy to mitigate immune dysfunction and improve clinical outcomes in HIV-infected individuals. By elucidating the intricate interplay between L-selectin signaling and T cell function, we can identify novel targets for immunotherapy aimed at restoring immune competence and combating HIV-related immune exhaustion.¹⁰²⁻¹¹²

Mechanisms of L-selectin-mediated Immune Exhaustion in HIV

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The progressive dysfunction of the immune system, characterized by T cell exhaustion, is a hallmark of chronic HIV infection. L-selectin, a pivotal adhesion molecule orchestrating immune cell trafficking and activation, has emerged as a potential contributor to the development and maintenance of immune exhaustion in HIV-infected individuals. Several mechanisms may underlie the role of L-selectin in promoting immune exhaustion during HIV infection, impacting T cell migration, activation, and survival. Dysregulated L-selectin expression and function can disrupt the migration of T cells to lymphoid tissues and sites of inflammation, impairing their ability to mount effective immune responses against HIV. Altered L-selectin interactions with endothelial ligands may lead to aberrant T cell adhesion and retention within tissues, limiting their access to antigen-presenting cells and pro-inflammatory signals necessary for sustained immune activation. L-selectin signaling pathways can modulate T cell activation thresholds, influencing the magnitude and duration of T cell responses. Dysregulated L-selectin signaling in HIV-infected individuals may lower T cell activation thresholds, leading to excessive T cell activation and subsequent exhaustion. Additionally, aberrant L-selectin-mediated signaling may promote the differentiation of T cells into exhausted phenotypes characterized by reduced effector function and proliferative capacity.¹¹³⁻¹²³

L-selectin signaling pathways play a role in regulating immune cell survival by modulating apoptotic pathways. HIV-induced alterations in L-selectin expression or function may disrupt pro-survival signaling cascades, rendering T cells more susceptible to apoptosis and immune dysfunction. Increased immune cell apoptosis contributes to the progressive depletion of CD4+ T cells and the development of immune exhaustion in HIV-infected individuals. Persistent immune activation and inflammation in HIV-infected individuals can dysregulate L-selectin-mediated immune responses, exacerbating immune exhaustion. Chronic exposure to inflammatory cytokines and immune activation markers can disrupt L-selectin signaling pathways, impairing T cell function and survival. Moreover, sustained immune activation may lead to the upregulation of inhibitory receptors on T cells, further promoting immune exhaustion and dysfunction. The local tissue microenvironment plays a crucial role in modulating L-selectin-mediated immune responses and influencing T cell fate. HIV-induced alterations in tissue architecture and composition may impact L-selectin interactions with endothelial ligands and stromal cells, altering T cell migration patterns and function. Dysregulated L-selectin-mediated immune responses within tissue microenvironments contribute to immune exhaustion and disease progression in HIV-infected individuals.¹²⁴⁻¹⁴⁰

Therapeutic Targeting of L-selectin Pathways

As our understanding of the role of L-selectin in HIV-related immune dysfunction expands, there is growing interest in exploring L-selectin as a potential therapeutic target for mitigating immune exhaustion and improving clinical outcomes in HIV-infected individuals. Targeting L-selectin pathways holds promise for modulating immune cell trafficking, activation, and survival, thereby restoring immune competence and enhancing host defense against HIV. Several strategies for therapeutic targeting of L-selectin pathways have been proposed, offering potential avenues for intervention in HIV-related immune dysfunction. Therapeutic interventions aimed at modulating

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L-selectin expression levels on circulating leukocytes may influence immune cell trafficking and activation dynamics in HIV-infected individuals. Strategies such as cytokine-based therapies or small molecule inhibitors targeting L-selectin expression pathways could be explored to regulate L-selectin levels and enhance immune cell migration to lymphoid tissues, where effective immune responses against HIV are initiated.¹⁴¹⁻¹⁴³

Inhibiting L-selectin interactions with its endothelial ligands represents a promising approach for preventing aberrant immune cell adhesion and retention within tissues, thereby mitigating immune exhaustion. Monoclonal antibodies or recombinant proteins targeting L-selectin or its ligands could be developed as therapeutic agents to disrupt L-selectin-mediated adhesion, facilitating immune cell egress from circulation into lymphoid tissues and sites of inflammation. Augmenting L-selectin signaling pathways may promote immune cell activation and survival, counteracting the effects of immune exhaustion in HIV-infected individuals. Therapeutic strategies aimed at enhancing L-selectin signaling cascades, such as agonistic antibodies or small molecule agonists targeting L-selectin receptors or downstream effectors, could be explored to bolster immune cell responses and restore immune competence in HIV-infected individuals. Combining L-selectin-targeted therapies with existing antiretroviral drugs or immunomodulatory agents may synergistically enhance therapeutic efficacy and improve clinical outcomes in HIV-infected individuals. Combinatorial approaches that simultaneously target multiple pathways implicated in immune exhaustion, including L-selectin pathways, could offer a comprehensive strategy for restoring immune function and controlling viral replication in HIV/AIDS. Tailoring therapeutic interventions targeting L-selectin pathways to individual patient profiles and disease characteristics may optimize treatment outcomes and minimize potential adverse effects. Personalized medicine approaches incorporating genetic, immunologic, and clinical factors could inform the selection of L-selectin-targeted therapies and guide treatment decisions in HIV-infected individuals.¹⁴⁴⁻¹⁴⁵

Conclusion

L-selectin emerges as a significant player in the intricate landscape of HIV-related immune dysfunction, particularly in the context of immune exhaustion. Through its multifaceted roles in immune cell trafficking, activation, and survival, L-selectin influences the dynamics of immune responses during chronic HIV infection. Dysregulated L-selectin expression and signaling pathways contribute to immune exhaustion by disrupting immune cell migration, altering activation thresholds, promoting apoptosis, and exacerbating chronic inflammation. Understanding the mechanisms underlying L-selectin-mediated immune exhaustion provides insights into potential therapeutic strategies for restoring immune competence and improving clinical outcomes in HIV-infected individuals. Therapeutic targeting of L-selectin pathways holds promise as a novel approach to mitigate immune exhaustion and enhance host defense against HIV. Strategies aimed at modulating L-selectin expression, blocking L-selectin interactions, enhancing L-selectin signaling, and employing combination therapies offer potential avenues for intervention in HIV-related immune dysfunction. Personalized medicine approaches that consider

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individual patient profiles and disease characteristics may further optimize the efficacy and safety of L-selectin-targeted interventions.

References

1. Nath A. Neurologic complications of human immunodeficiency virus infection. *Continuum: Lifelong Learning in Neurology*. 2015;21(6):1557-1576.
2. Nookala AR, Mitra J, Chaudhari NS, Hegde ML, Kumar A. An overview of human immunodeficiency virus type 1-associated common neurological complications: does aging pose a challenge? *Journal of Alzheimer's Disease*. 2017;60(s1):S169-S193.
3. Almodovar S. The complexity of HIV persistence and pathogenesis in the lung under antiretroviral therapy: challenges beyond AIDS. *Viral immunology*. 2014;27(5):186-199.
4. Obeagu EI. An update on susceptibility of individuals to diseases based on ABO blood groups. *Int. J. Curr. Res. Med. Sci*. 2019;5(3):1-8.
5. Obeagu EI, Babar Q, Vincent CC, Okafor CJ, Eze R, Chijioke UO, Ibekwe AM, Uduchi IO. Pulmonary Embolism in Covid-19 Pandemic: A Threat to Recovery of the Infected Patients. *Journal of Pharmaceutical Research International*. 2021;33(42A):90-98.
6. Obeagu EI, Obeagu GU. Platelet-Driven Modulation of HIV: Unraveling Interactions and Implications. *Journal home page: <http://www.journalijar.com>*. 2024;12(01).
7. Onuigwe FU, Ambi H, Uchechukwu NJ, Obeagu EI. Platelet Dysfunction in Diabetes Mellitus. *Elite Journal of Medicine*. 2024;2(2):1-7.
8. Obeagu EI, Obeagu GU. Studies on platelets diagnostic indexes in patients with acute myeloid leukaemia in Uganda. *Int. J. Curr. Res. Med. Sci*. 2023;9(1):24-27.
9. Obeagu EI, Okechukwu PU, Alum EU, Obeagu GU, Opoku D, Scott GY, Amekpor F. Platelets as actors in inflammation and immunity: A fulcrum in immunity. *Int. J. Adv. Res. Biol. Sci*. 2023;10(3):81-89.
10. Obeagu EI, Mbabazi A, Obeagu GU, Muhimbura E, Igwe MC, Owunna TA, Okafor CJ, Jakheng SP. Evaluation of Platelets and Some Inflammation Markers of Patients with Acute Myeloid Leukaemia In A Tertiary Hospital In Uganda. *Madonna University journal of Medicine and Health Sciences ISSN: 2814-3035*. 2022;2(3):78-84.
11. Obeagu EI, Obeagu GU. Platelet Distribution Width (PDW) as a Prognostic Marker for Anemia Severity in HIV Patients: A Comprehensive Review. *Journal home page: <http://www.journalijar.com>*;12(01).
12. Ifeanyi OE, Favour AA, Prayer NN. Updates on Human Immunodeficiency Virus and Platelets. *Int. J. Adv. Res. Biol. Sci*. 2020;7(6):1-7.
13. Obeagu EI, Muhimbura E, Kagenderezho BP, Nakyeyune S, Obeagu GU. An Insight of Interleukin-6 and Fibrinogen: In Regulating the Immune System. *J Biomed Sci*. 2022;11(10):83.
14. Obeagu EI, Okwuanaso CB, Edoho SH, Obeagu GU. Under-nutrition among HIV-exposed Uninfected Children: A Review of African Perspective. *Madonna University journal of Medicine and Health Sciences*. 2022;2(3):120-127.
15. Obeagu EI, Alum EU, Obeagu GU. Factors associated with prevalence of HIV among youths: A review of Africa perspective. *Madonna University journal of Medicine and*

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- Health Sciences. 2023;3(1):13-18.
<https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/93>.
16. Obeagu EI. A Review of Challenges and Coping Strategies Faced by HIV/AIDS Discordant Couples. Madonna University journal of Medicine and Health Sciences. 2023 ;3(1):7-12.
<https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/91>.
 17. Obeagu EI, Obeagu GU. An update on premalignant cervical lesions and cervical cancer screening services among HIV positive women. J Pub Health Nutri. 2023; 6 (2). 2023; 141:1-2. [links/63e538ed64252375639dd0df/An-update-on-premalignant-cervical-lesions-and-cervical-cancer-screening-services-among-HIV-positive-women.pdf](https://doi.org/10.22192/ijcrms.2023.09.02.001).
 18. Ezeoru VC, Enweani IB, Ochiabuto O, Nwachukwu AC, Ogbonna US, Obeagu EI. Prevalence of Malaria with Anaemia and HIV status in women of reproductive age in Onitsha, Nigeria. Journal of Pharmaceutical Research International. 2021;33(4):10-19.
 19. Omo-Emmanuel UK, Chinedum OK, Obeagu EI. Evaluation of laboratory logistics management information system in HIV/AIDS comprehensive health facilities in Bayelsa State, Nigeria. Int J Curr Res Med Sci. 2017;3(1): 21-38.DOI: [10.22192/ijcrms.2017.03.01.004](https://doi.org/10.22192/ijcrms.2017.03.01.004)
 20. Obeagu EI, Obeagu GU, Musiimenta E, Bot YS, Hassan AO. Factors contributing to low utilization of HIV counseling and testing services. Int. J. Curr. Res. Med. Sci. 2023;9(2): 1-5.DOI: [10.22192/ijcrms.2023.09.02.001](https://doi.org/10.22192/ijcrms.2023.09.02.001)
 21. Obeagu EI, Obeagu GU. An update on survival of people living with HIV in Nigeria. J Pub Health Nutri. 2022; 5 (6). 2022;129. [links/645b4bfcf3512f1cc5885784/An-update-on-survival-of-people-living-with-HIV-in-Nigeria.pdf](https://doi.org/10.22192/ijcrms.2023.09.02.001).
 22. Offie DC, Obeagu EI, Akueshi C, Njab JE, Ekanem EE, Dike PN, Oguh DN. Facilitators and barriers to retention in HIV care among HIV infected MSM attending Community Health Center Yaba, Lagos Nigeria. Journal of Pharmaceutical Research International. 2021;33(52B):10-19.
 23. Obeagu EI, Ogbonna US, Nwachukwu AC, Ochiabuto O, Enweani IB, Ezeoru VC. Prevalence of Malaria with Anaemia and HIV status in women of reproductive age in Onitsha, Nigeria. Journal of Pharmaceutical Research International. 2021;33(4):10-19.
 24. Obeagu EI, Muhimbura E, Kagenderezo BP, Nakyeyune S, Obeagu GU. An Insight of Interleukin-6 and Fibrinogen: In Regulating the Immune System. J Biomed Sci. 2022;11(10):83.
 25. Okoroiwu IL, Obeagu EI, Vivian Egwim V. Assessment of White Blood Cell Count and Platelet Count in Women on Hormonal Contraceptives in Owerri, Imo State, Nigeria. J Res Med Dent Sci. 2021;9(12):498-501.
 26. Obeagu EI, Okoroiwu IL, Obeagu GU. Relationship between Thrombopoietin and Interleukin 3: A Review. Int J Curr Res Chem Pharm. Sci. 2022;9(1):7-13.
 27. Ukonu UC, Nwosu DC, Okoroiwu LI, Dike-Ndudim JN, Ukonu GO, Obeagu EI. Evaluation of Alloantibodies to human platelet antigen and Leucocyte antigen class 1 in Multitransfused patients in Owerri, Imo state. Int. J. Curr. Res. Med. Sci. 2023;9(1):38-44.
 28. Obeagu EI. Gestational Thrombocytopenia. J Gynecol Women's Health. 2023;25(3):556163.

Citation: Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. Elite Journal of HIV, 2024; 2(2): 43-59

29. Okoroiwu IL, Obeagu EI, Obeagu GU. Determination of clot retraction in pregnant women attending antenatal clinic in federal medical centre Owerri, Nigeria. *Madonna University Journal of Medicine and Health Sciences*. 2022;2(2):91-97.
30. Ezimah AC, Obeagu EI, Asur A, Ezimah UA, Ezimah CO. Absolute platelet count in adult patients with musculoskeletal pain: Current perspectives. *Int. J. Curr. Res. Med. Sci*. 2016;2(2):30-7.
31. Anyiam AF, Musa Muhibi MA, Iyare G, Omosigho PO, Olaniyan MF, Arinze-Anyiam OC, Oluwafemi E, Obeagu EI. Effects of different Extracts of *Phyllanthus amarus* on selected haematological and haemostatic parameters of Leukemic Wistar Rats. *Elite Journal of Medica Science*. 2024;2(1):23-43.
32. Okoroiwu IL, Obeagu EI, Anaebo QB, Walter O. Evaluation of activated partial thromboplastin time and prothrombin time in HIV and TB patients in Owerri metropolis. *J Pharm Res Int*. 2022;21:29-34.
33. Obeagu EI, Ikpenwa JN, Chukwueze CM, Obeagu GU. Evaluation of protein C, protein S and fibrinogen of pregnant women in Owerri Metropolis. *Madonna University Journal of Medicine and Health Sciences* ISSN: 2814-3035. 2022 Apr 18;2(1):292-8.
34. Oloro OH, Oke TO, Obeagu EI. Evaluation of coagulation profile patients with pulmonary tuberculosis and human immunodeficiency virus in Owo, Ondo state, Nigeria. *Madonna University journal of Medicine and Health Sciences* ISSN: 2814-3035. 2022 Oct 16;2(3):110-9.
35. Ohale AC, Obeagu EI, Mark HA, Okoli CC, Ezepue CB, Ohanu CE, Okongwu UC, Nlemadim CI, Ekeigwe IB, Okeke OA. The Sub-Acute Effects of Raw Honey on Prothrombin Time, Activated Partial Thromboplastin Time and Platelet Values in Albino Wistar Rats. *Journal of Advances in Medicine and Medical Research*. 2020 Oct 1;32(17):68-73.
36. Odo M, Ochei KC, Obeagu EI, Barinaadaa A, Eteng UE, Ikpeme M, Bassey JO, Paul AO. TB Infection Control in TB/HIV Settings in Cross River State, Nigeria: Policy Vs Practice. *Journal of Pharmaceutical Research International*. 2020;32(22):101-119.
37. Obeagu EI, Eze VU, Alaebob EA, Ochei KC. Determination of haematocrit level and iron profile study among persons living with HIV in Umuahia, Abia State, Nigeria. *J BioInnovation*. 2016; 5:464-471. [links/592bb4990f7e9b9979a975cf/DETERMINATION-OF-HAEMATOCRIT-LEVEL-AND-IRON-PROFILE-STUDY-AMONG-PERSONS-LIVING-WITH-HIV-IN-UMUAHIA-ABIA-STATE-NIGERIA.pdf](https://doi.org/10.59238/592bb4990f7e9b9979a975cf/DETERMINATION-OF-HAEMATOCRIT-LEVEL-AND-IRON-PROFILE-STUDY-AMONG-PERSONS-LIVING-WITH-HIV-IN-UMUAHIA-ABIA-STATE-NIGERIA.pdf).
38. Ifeanyi OE, Obeagu GU. The values of prothrombin time among HIV positive patients in FMC owerri. *International Journal of Current Microbiology and Applied Sciences*. 2015;4(4):911-916.
[https://www.academia.edu/download/38320140/Obeagu Emmanuel Ifeanyi and Obeagu Getrude Uzoma2.EMMA1.pdf](https://www.academia.edu/download/38320140/Obeagu_Emanuel_Ifeanyi_and_Obeagu_Getrude_Uzoma2.EMMA1.pdf).
39. Izuchukwu IF, Ozims SJ, Agu GC, Obeagu EI, Onu I, Amah H, Nwosu DC, Nwanjo HU, Edward A, Arunsi MO. Knowledge of preventive measures and management of HIV/AIDS victims among parents in Umuna Orlu community of Imo state Nigeria. *Int. J. Adv. Res. Biol. Sci*. 2016;3(10): 55-65.DOI; [10.22192/ijarbs.2016.03.10.009](https://doi.org/10.22192/ijarbs.2016.03.10.009)

Citation: Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. *Elite Journal of HIV*, 2024; 2(2): 43-59

40. Chinedu K, Takim AE, Obeagu EI, Chinazor UD, Eloghosa O, Ojong OE, Odunze U. HIV and TB co-infection among patients who used Directly Observed Treatment Short-course centres in Yenagoa, Nigeria. IOSR J Pharm Biol Sci. 2017;12(4):70-75. [links/5988ab6d0f7e9b6c8539f73d/HIV-and-TB-co-infection-among-patients-who-used-Directly-Observed-Treatment-Short-course-centres-in-Yenagoa-Nigeria.pdf](https://epjournals.com/journals/EJHIV/links/5988ab6d0f7e9b6c8539f73d/HIV-and-TB-co-infection-among-patients-who-used-Directly-Observed-Treatment-Short-course-centres-in-Yenagoa-Nigeria.pdf)
41. Oloro OH, Oke TO, Obeagu EI. Evaluation of Coagulation Profile Patients with Pulmonary Tuberculosis and Human Immunodeficiency Virus in Owo, Ondo State, Nigeria. Madonna University journal of Medicine and Health Sciences. 2022;2(3):110-119.
42. Nwosu DC, Obeagu EI, Nkwocha BC, Nwanna CA, Nwanjo HU, Amadike JN, Elendu HN, Ofoedeme CN, Ozims SJ, Nwankpa P. Change in Lipid Peroxidation Marker (MDA) and Non enzymatic Antioxidants (VIT C & E) in HIV Seropositive Children in an Urban Community of Abia State. Nigeria. J. Bio. Innov. 2016;5(1):24-30. [links/5ae735e9a6fdcc5b33eb8d6a/CHANGE-IN-LIPID-PEROXIDATION-MARKER-MDAAND-NON-ENZYMATIC-ANTIOXIDANTS-VIT-C-E-IN-HIV-SEROPOSITIVE-CHILDREN-IN-AN-URBAN-COMMUNITY-OF-ABIA-STATE-NIGERIA.pdf](https://epjournals.com/journals/EJHIV/links/5ae735e9a6fdcc5b33eb8d6a/CHANGE-IN-LIPID-PEROXIDATION-MARKER-MDAAND-NON-ENZYMATIC-ANTIOXIDANTS-VIT-C-E-IN-HIV-SEROPOSITIVE-CHILDREN-IN-AN-URBAN-COMMUNITY-OF-ABIA-STATE-NIGERIA.pdf).
43. Igwe CM, Obeagu IE, Ogbuabor OA. Clinical characteristics of people living with HIV/AIDS on ART in 2014 at tertiary health institutions in Enugu, Nigeria. J Pub Health Nutri. 2022; 5 (6). 2022;130. [links/645a166f5762c95ac3817d32/Clinical-characteristics-of-people-living-with-HIV-AIDS-on-ART-in-2014-at-tertiary-health-institutions-in-Enugu.pdf](https://epjournals.com/journals/EJHIV/links/645a166f5762c95ac3817d32/Clinical-characteristics-of-people-living-with-HIV-AIDS-on-ART-in-2014-at-tertiary-health-institutions-in-Enugu.pdf).
44. Ifeanyi OE, Obeagu GU, Ijeoma FO, Chioma UI. The values of activated partial thromboplastin time (APTT) among HIV positive patients in FMC Owerri. Int J Curr Res Aca Rev. 2015; 3:139-144. https://www.academia.edu/download/38320159/Obeagu_Emanuel_Ifeanyi3_et_al.IJC_RAR.pdf.
45. Obiomah CF, Obeagu EI, Ochei KC, Swem CA, Amachukwu BO. Hematological indices o HIV seropositive subjects in Nnamdi Azikiwe University teaching hospital (NAUTH), Nnewi. Ann Clin Lab Res. 2018;6(1):1-4. [links/5aa2bb17a6fdccd544b7526e/Haematological-Indices-of-HIV-Seropositive-Subjects-at-Nnamdi-Azikiwe.pdf](https://epjournals.com/journals/EJHIV/links/5aa2bb17a6fdccd544b7526e/Haematological-Indices-of-HIV-Seropositive-Subjects-at-Nnamdi-Azikiwe.pdf)
46. Reno TA, Tarnus L, Tracy R, Landay AL, Sereti I, Apetrei C, Pandrea I. The youngbloods. Get together. Hypercoagulation, complement, and NET formation in HIV/SIV pathogenesis. Frontiers in Virology. 2022; 1:795373.
47. Obeagu EI, Ogunnaya FU. Pregnancyinduced Haematological Changes: A Key to Maternal and Child Health. European Journal of Biomedical. 2023;10(8):42-43.
48. Obeagu EI, Chikelu IM, Obarezi TN, Ogbuabor BN, Anaebio QB. Haematological effects of fluted pumpkin (Telfairia occidentalis) leaves in rats. International Journal of Life Sciences Biotechnology and Pharma Research. 2014;3(1):172-182.
49. Alum EU, Ugwu OP, Aja PM, Obeagu EI, Inya JE, Onyeije AP, Agu E, Awuchi CG. Restorative effects of ethanolic leaf extract of Datura stramonium against methotrexate-induced hematological impairments. Cogent Food & Agriculture. 2023;9(1):2258774.

Citation: Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. Elite Journal of HIV, 2024; 2(2): 43-59

50. Igwe MC, Obeagu EI. Determination of the Effect of Methanol Extract of Tetrapleura Tetraptera Fruit Osmotic Fragility of Erythrocytes, Platelet Aggregation and Phospholipase A2 Activity. *Ann. Clin. Lab. Res.* 2018; 6:250-255.
51. Obeagu EF, Onyenweaku FC, Nwobodo HA, Ochei KC, Ochiabuto Ogochukwu MT, Onwuasoanya UF. Impact of HIV and hepatitis b virus coinfection on selected haematological markers of the patients in Umuahia, Abia State, Nigeria. *Ann Clin Lab Res.* 2017;5(2):175.
52. Obeagu EI, Adepoju OJ, Okafor CJ, Obeagu GU, Ibekwe AM, Okpala PU, Agu CC. Assessment of Haematological Changes in Pregnant Women of Ido, Ondo State, Nigeria. *J Res Med Dent Sci.* 2021;9(4):145-148.
53. Ifeanyi OE, Obeagu GU. The values of prothrombin time among HIV positive patients in FMC owerri. *International Journal of Current Microbiology and Applied Sciences.* 2015;4(4):911-6.
54. Okorie HM, Obeagu EI, Eze EN, Jeremiah ZA. Assessment of coagulation parameters in malaria infected pregnant women in Imo state, Nigeria. *International Journal of Current Research in Medical Sciences.* 2018;4(9):41-9.
55. Obeagu EI, Babar Q, Vincent CC, Okafor CJ, Eze R, Chijioke UO, Ibekwe AM, Uduchi IO. Pulmonary Embolism in Covid-19 Pandemic: A Threat to Recovery of the Infected Patients. *Journal of Pharmaceutical Research International.* 2021 Aug 26;33(42A):90-8.
56. Ifeanyi OE, Obeagu GU, Ijeoma FO, Chioma UI. The values of activated partial thromboplastin time (APTT) among HIV positive patients in FMC Owerri. *Int J Curr Res Aca Rev.* 2015;3:139-44.
57. Edward Henry SI, Obeagu EI. Assessment of the Serum Iron Status of Preeclampsia Subjects in Aba, Abia State. *Elite Journal of Haematology.* 2024;2(1):10-8.
58. Omo-Emmanuel UK, Ochei KC, Osuala EO, Obeagu EI, Onwuasoanya UF. Impact of prevention of mother to child transmission (PMTCT) of HIV on positivity rate in Kafanchan, Nigeria. *Int. J. Curr. Res. Med. Sci.* 2017;3(2): 28-34.DOI: [10.22192/ijcrms.2017.03.02.005](https://doi.org/10.22192/ijcrms.2017.03.02.005)
59. Aizaz M, Abbas FA, Abbas A, Tabassum S, Obeagu EI. Alarming rise in HIV cases in Pakistan: Challenges and future recommendations at hand. *Health Science Reports.* 2023;6(8):e1450.
60. Obeagu EI, Amekpor F, Scott GY. An update of human immunodeficiency virus infection: Bleeding disorders. *J Pub Health Nutri.* 2023; 6 (1). 2023;139. [links/645b4a6c2edb8e5f094d9bd9/An-update-of-human-immunodeficiency-virus-infection-Bleeding.pdf](https://doi.org/10.22192/ijcrms.2017.03.02.005).
61. Obeagu EI, Scott GY, Amekpor F, Ofodile AC, Edoho SH, Ahamefula C. Prevention of New Cases of Human Immunodeficiency Virus: Pragmatic Approaches of Saving Life in Developing Countries. *Madonna University journal of Medicine and Health Sciences.* 2022;2(3):128-134. <https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/86>.
62. Walter O, Anaebio QB, Obeagu EI, Okoroiwu IL. Evaluation of Activated Partial Thromboplastin Time and Prothrombin Time in HIV and TB Patients in Owerri Metropolis. *Journal of Pharmaceutical Research International.* 2022:29-34.

Citation: Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. *Elite Journal of HIV*, 2024; 2(2): 43-59

63. Odo M, Ochei KC, Obeagu EI, Barinaadaa A, Eteng EU, Ikpeme M, Bassey JO, Paul AO. Cascade variabilities in TB case finding among people living with HIV and the use of IPT: assessment in three levels of care in cross River State, Nigeria. *Journal of Pharmaceutical Research International*. 2020;32(24):9-18.
64. Jakheng SP, Obeagu EI. Seroprevalence of human immunodeficiency virus based on demographic and risk factors among pregnant women attending clinics in Zaria Metropolis, Nigeria. *J Pub Health Nutri*. 2022; 5 (8). 2022;137. [links/6317a6b1acd814437f0ad268/Seroprevalence-of-human-immunodeficiency-virus-based-on-demographic-and-risk-factors-among-pregnant-women-attending-clinics-in-Zaria-Metropolis-Nigeria.pdf](https://doi.org/10.22192/ijarbs.2023.10.09.015).
65. Obeagu EI, Obeagu GU. A Review of knowledge, attitudes and socio-demographic factors associated with non-adherence to antiretroviral therapy among people living with HIV/AIDS. *Int. J. Adv. Res. Biol. Sci*. 2023;10(9):135-142.DOI: [10.22192/ijarbs.2023.10.09.015](https://doi.org/10.22192/ijarbs.2023.10.09.015) [links/6516faa61e2386049de5e828/A-Review-of-knowledge-attitudes-and-socio-demographic-factors-associated-with-non-adherence-to-antiretroviral-therapy-among-people-living-with-HIV-AIDS.pdf](https://doi.org/10.22192/ijarbs.2023.10.09.015)
66. Obeagu EI, Onuoha EC. Tuberculosis among HIV Patients: A review of Prevalence and Associated Factors. *Int. J. Adv. Res. Biol. Sci*. 2023;10(9):128-134.DOI: [10.22192/ijarbs.2023.10.09.014](https://doi.org/10.22192/ijarbs.2023.10.09.014) [links/6516f938b0df2f20a2f8b0e0/Tuberculosis-among-HIV-Patients-A-review-of-Prevalence-and-Associated-Factors.pdf](https://doi.org/10.22192/ijarbs.2023.10.09.014).
67. Obeagu EI, Ibeh NC, Nwobodo HA, Ochei KC, Iwegbulam CP. Haematological indices of malaria patients coinfectd with HIV in Umuahia. *Int. J. Curr. Res. Med. Sci*. 2017;3(5):100-104.DOI: [10.22192/ijcrms.2017.03.05.014](https://doi.org/10.22192/ijcrms.2017.03.05.014) [https://www.academia.edu/download/54317126/Haematological_indices_of_malaria_patients_coinfectd_with_HIV.pdf](https://doi.org/10.22192/ijcrms.2017.03.05.014)
68. Oke OT, Eyitayo EF, Obeagu EI. Inhalation effect of insecticides on some Haematological parameters of rabbits. *Int. J. Curr. Res. Chem. Pharm. Sci*. 2022;9(9):1-9.
69. Obeagu EI, Obeagu GU, Obiezu J, Ezeonwumelu C, Ogunnaya FU, Ngwoke AO, Emeka-Obi OR, Ugwu OP. Hematologic Support in HIV Patients: Blood Transfusion Strategies and Immunological Considerations. *APPLIED SCIENCES (NIJBAS)*. 2023;3(3).
70. Ifeanyi OE, Obeagu GU. The values of prothrombin time among HIV positive patients in FMC owerri. *International Journal of Current Microbiology and Applied Sciences*. 2015;4(4):911-6.
71. Offie DC, Ibekwe AM, Agu CC, Esimai BN, Okpala PU, Obeagu EI, Ufelle SA, Ogbonna LN. Fibrinogen and C-Reactive Protein Significance in Children Infected by Plasmodium falciparum Species in Enugu, Enugu State, Nigeria. *Journal of Pharmaceutical Research International*. 2021;33(15):1-8.
72. Obeagu E, Nwosu D, Obeagu III G. Antithrombin III: A Review. *Int. J. Curr. Res. Biol. Med*. 2022;7(2):20-27.
73. Jakheng SP, Obeagu EI, Abdullahi IO, Jakheng EW, Chukwueze CM, Eze GC, Essien UC, Madekwe CC, Madekwe CC, Vidya S, Kumar S. Distribution Rate of Chlamydial Infection According to Demographic Factors among Pregnant Women Attending Clinics in Zaria

Citation: Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. *Elite Journal of HIV*, 2024; 2(2): 43-59

- Metropolis, Kaduna State, Nigeria. South Asian Journal of Research in Microbiology. 2022;13(2):26-31.
74. Viola N, Kimono E, Nuruh N, Obeagu EI. Factors Hindering Elimination of Mother to Child Transmission of HIV Service Uptake among HIV Positive Women at Comboni Hospital Kyamuhunga Bushenyi District. Asian Journal of Dental and Health Sciences. 2023;3(2):7-14. <http://ajdhs.com/index.php/journal/article/view/39>.
75. Okorie HM, Obeagu Emmanuel I, Okpoli Henry CH, Chukwu Stella N. Comparative study of enzyme linked immunosorbent assay (Elisa) and rapid test screening methods on HIV, Hbsag, Hcv and Syphilis among voluntary donors in. Owerri, Nigeria. J Clin Commun Med. 2020;2(3):180-183.DOI: **DOI:** [10.32474/JCCM.2020.02.000137](https://doi.org/10.32474/JCCM.2020.02.000137)
[links/5f344530458515b7291bd95f/Comparative-Study-of-Enzyme-Linked-Immunosorbent-Assay-ELISA-and-Rapid-Test-Screening-Methods-on-HIV-HBsAg-HCV-and-Syphilis-among-Voluntary-Donors-in-Owerri-Nigeria.pdf](https://doi.org/10.32474/JCCM.2020.02.000137).
76. Ezugwu UM, Onyenekwe CC, Ukibe NR, Ahaneku JE, Onah CE, Obeagu EI, Emeje PI, Awalu JC, Igbokwe GE. Use of ATP, GTP, ADP and AMP as an Index of Energy Utilization and Storage in HIV Infected Individuals at NAUTH, Nigeria: A Longitudinal, Prospective, Case-Controlled Study. Journal of Pharmaceutical Research International. 2021;33(47A):78-84.
77. Emmanuel G, Martin O, Peter OS, Obeagu EI, Daniel K. Factors Influencing Early Neonatal Adverse Outcomes among Women with HIV with Post Dated Pregnancies Delivering at Kampala International University Teaching Hospital, Uganda. Asian Journal of Pregnancy and Childbirth. 2023 Jul 29;6(1):203-211. <http://research.sdpublishers.net/id/eprint/2819/>.
78. Igwe MC, Obeagu EI, Ogbuabor AO, Eze GC, Ikpenwa JN, Eze-Stephen PE. Socio-Demographic Variables of People Living with HIV/AIDS Initiated on ART in 2014 at Tertiary Health Institution in Enugu State. Asian Journal of Research in Infectious Diseases. 2022;10(4):1-7.
79. Vincent CC, Obeagu EI, Agu IS, Ukeagu NC, Onyekachi-Chigbu AC. Adherence to Antiretroviral Therapy among HIV/AIDS in Federal Medical Centre, Owerri. Journal of Pharmaceutical Research International. 2021;33(57A):360-368.
80. Igwe MC, Obeagu EI, Ogbuabor AO. ANALYSIS OF THE FACTORS AND PREDICTORS OF ADHERENCE TO HEALTHCARE OF PEOPLE LIVING WITH HIV/AIDS IN TERTIARY HEALTH INSTITUTIONS IN ENUGU STATE. Madonna University journal of Medicine and Health Sciences. 2022;2(3):42-57. <https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/75>.
81. Madekwe CC, Madekwe CC, Obeagu EI. Inequality of monitoring in Human Immunodeficiency Virus, Tuberculosis and Malaria: A Review. Madonna University journal of Medicine and Health Sciences. 2022;2(3):6-15. <https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/69>
82. Echendu GE, Vincent CC, Ibebuikwe J, Asodike M, Naze N, Chinedu EP, Ohale B, Obeagu EI. WEIGHTS OF INFANTS BORN TO HIV INFECTED MOTHERS: A PROSPECTIVE COHORT STUDY IN FEDERAL MEDICAL CENTRE, OWERRI, IMO STATE. European Journal of Pharmaceutical and Medical Research, 2023; 10(8): 564-568

Citation: Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. Elite Journal of HIV, 2024; 2(2): 43-59

- Citation:** Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. Elite Journal of HIV, 2024; 2(2): 43-59

[20Human%20Immune%20Deficiency%20Virus%20among%20Pregnant%20Women%20Attending%20Antenatal%20Clinic%20in%20Imo%20State%20University%20Teaching%20Hospital.pdf](#).

95. Obeagu EI, Obarezi TN, Omeh YN, Okoro NK, Eze OB. Assessment of some haematological and biochemical parameters in HIV patients before receiving treatment in Aba, Abia State, Nigeria. *Res J Pharma Biol Chem Sci*. 2014; 5:825-830.
96. Obeagu EI, Obarezi TN, Ogbuabor BN, Anaebio QB, Eze GC. Pattern of total white blood cell and differential count values in HIV positive patients receiving treatment in Federal Teaching Hospital Abakaliki, Ebonyi State, Nigeria. *International Journal of Life Science, Biotechnology and Pharma Research*. 2014; 391:186-189.
97. Obeagu EI. A Review of Challenges and Coping Strategies Faced by HIV/AIDS Discordant Couples. *Madonna University journal of Medicine and Health Sciences*. 2023; 3 (1): 7-12.
98. Oloro OH, Obeagu EI. A Systematic Review on Some Coagulation Profile in HIV Infection. *International Journal of Innovative and Applied Research*. 2022;10(5):1-11.
99. Nwosu DC, Obeagu EI, Nkwuocha BC, Nwanna CA, Nwanjo HU, Amadike JN, Ezemma MC, Okpomeshine EA, Ozims SJ, Agu GC. Alterations in superoxide dismutase, vitamins C and E in HIV infected children in Umuahia, Abia state. *International Journal of Advanced Research in Biological Sciences*. 2015;2(11):268-271.
100. Obeagu EI, Malot S, Obeagu GU, Ugwu OP. HIV resistance in patients with Sickle Cell Anaemia. *Newport International Journal of Scientific and Experimental Sciences (NIJSES)*. 2023;3(2):56-59.
101. Ifeanyi OE, Uzoma OG, Stella EI, Chinedum OK, Abum SC. Vitamin D and insulin resistance in HIV sero positive individuals in Umudike. *Int. J. Curr. Res. Med. Sci*. 2018;4(2):104-108.
102. Ifeanyi OE, Leticia OI, Nwosu D, Chinedum OK. A Review on blood borne viral infections: universal precautions. *Int. J. Adv. Res. Biol. Sci*. 2018;5(6):60-66.
103. Nwovu AI, Ifeanyi OE, Uzoma OG, Nwebonyi NS. Occurrence of Some Blood Borne Viral Infection and Adherence to Universal Precautions among Laboratory Staff in Federal Teaching Hospital Abakaliki Ebonyi State. *Arch Blood Transfus Disord*. 2018;1(2).
104. Chinedu K, Takim AE, Obeagu EI, Chinazor UD, Eloghosa O, Ojong OE, Odunze U. HIV and TB co-infection among patients who used Directly Observed Treatment Short-course centres in Yenagoa, Nigeria. *IOSR J Pharm Biol Sci*. 2017;12(4):70-75.
105. Offie DC, Obeagu EI, Akueshi C, Njab JE, Ekanem EE, Dike PN, Oguh DN. Facilitators and barriers to retention in HIV care among HIV infected MSM attending Community Health Center Yaba, Lagos Nigeria. *Journal of Pharmaceutical Research International*. 2021;33(52B):10-19.
106. Obeagu EI, Obeagu GU, Ede MO, Odo EO, Buhari HA. Translation of HIV/AIDS knowledge into behavior change among secondary school adolescents in Uganda: A review. *Medicine (Baltimore)*. 2023;102(49): e36599. doi: 10.1097/MD.00000000000036599. PMID: 38065920; PMCID: PMC10713174.

Citation: Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. *Elite Journal of HIV*, 2024; 2(2): 43-59

107. Anyiam AF, Arinze-Anyiam OC, Ironi EA, Obeagu EI. Distribution of ABO and rhesus blood grouping with HIV infection among blood donors in Ekiti State Nigeria. *Medicine (Baltimore)*. 2023;102(47): e36342. doi: 10.1097/MD.00000000000036342. PMID: 38013335; PMCID: PMC10681551.
108. Echefu SN, Udosen JE, Akwiwu EC, Akpotuzor JO, Obeagu EI. Effect of Dolutegravir regimen against other regimens on some hematological parameters, CD4 count and viral load of people living with HIV infection in South Eastern Nigeria. *Medicine (Baltimore)*. 2023;102(47): e35910. doi: 10.1097/MD.00000000000035910. PMID: 38013350; PMCID: PMC10681510.
109. Opeyemi AA, Obeagu EI. Regulations of malaria in children with human immunodeficiency virus infection: A review. *Medicine (Baltimore)*. 2023;102(46): e36166. doi: 10.1097/MD.00000000000036166. PMID: 37986340; PMCID: PMC10659731.
110. Alum EU, Obeagu EI, Ugwu OPC, Samson AO, Adepoju AO, Amusa MO. Inclusion of nutritional counseling and mental health services in HIV/AIDS management: A paradigm shift. *Medicine (Baltimore)*. 2023;102(41): e35673. doi: 10.1097/MD.00000000000035673. PMID: 37832059; PMCID: PMC10578718.
111. Aizaz M, Abbas FA, Abbas A, Tabassum S, Obeagu EI. Alarming rise in HIV cases in Pakistan: Challenges and future recommendations at hand. *Health Sci Rep*. 2023;6(8): e1450. doi: 10.1002/hsr2.1450. PMID: 37520460; PMCID: PMC10375546.
112. Obeagu EI, Obeagu GU, Obiezu J, Ezeonwumelu C, Ogunnaya FU, Ngwoke AO, Emeka-Obi OR, Ugwu OP. Hematologic Support in HIV Patients: Blood Transfusion Strategies and Immunological Considerations. *APPLIED SCIENCES (NIJBAS)*. 2023;3(3).
113. Obeagu EI, Ubosi NI, Uzoma G. Storms and Struggles: Managing HIV Amid Natural Disasters. *Int. J. Curr. Res. Chem. Pharm. Sci*. 2023;10(11):14-25.
114. Obeagu EI, Obeagu GU. Human Immunodeficiency Virus and tuberculosis infection: A review of prevalence of associated factors. *Int. J. Adv. Multidiscip. Res*. 2023;10(10):56-62.
115. Obeagu EI, Malot S, Obeagu GU, Ugwu OP. HIV resistance in patients with Sickle Cell Anaemia. *Newport International Journal of Scientific and Experimental Sciences (NIJSES)*. 2023;3(2):56-9.
116. Alum EU, Ugwu OP, Obeagu EI, Aja PM, Okon MB, Uti DE. Reducing HIV Infection Rate in Women: A Catalyst to reducing HIV Infection pervasiveness in Africa. *International Journal of Innovative and Applied Research*. 2023;11(10):01-6.
117. Obeagu EI, Obeagu GU. Unmasking the Truth: Addressing Stigma in the Fight Against HIV. *Elite Journal of Public Health*. 2024;2(1):8-22.
118. Obeagu EI, Obeagu GU, Okwuanaso CB. Optimizing Immune Health in HIV Patients through Nutrition: A Review. *Elite Journal of Immunology*. 2024;2(1):14-33.
119. Obeagu EI, Obeagu GU. Utilization of immunological ratios in HIV: Implications for monitoring and therapeutic strategies. *Medicine*. 2024;103(9):e37354.
120. Obeagu EI, Obeagu GU. CD8 Dynamics in HIV Infection: A Synoptic Review. *Elite Journal of Immunology*. 2024;2(1):1-3.

Citation: Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. *Elite Journal of HIV*, 2024; 2(2): 43-59

121. Obeagu EI, Obeagu GU. Implications of B Lymphocyte Dysfunction in HIV/AIDS. *Elite Journal of Immunology*. 2024;2(1):34-46.
122. Obeagu EI, Obeagu GU. Maternal Influence on Infant Immunological Responses to HIV: A Review. *Elite Journal of Laboratory Medicine*. 2024;2(1):46-58.
123. Obeagu EI, Obeagu GU. Understanding B Lymphocyte Functions in HIV Infection: Implications for Immune Dysfunction and Therapeutic Strategies. *Elite Journal of Medicine*. 2024;2(1):35-46.
124. Obeagu EI, Obeagu GU. Platelet-Driven Modulation of HIV: Unraveling Interactions and Implications. *Journal home page: <http://www.journalijar.com>;12(01)*.
125. Obeagu EI, Anyiam AF, Obeagu GU. Managing Hematological Complications in HIV: Erythropoietin Considerations. *Elite Journal of HIV*. 2024;2(1):65-78.
126. Obeagu EI, Obeagu GU, Hauwa BA, Umar AI. Hematocrit Variations in HIV Patients Co-infected with Malaria: A Comprehensive Review. *Journal home page: <http://www.journalijar.com>;12(01)*.
127. ObeaguEI AA, Obeagu GU. Synergistic Effects of Blood Transfusion and HIV in Children Under 5 Years with Severe Malaria: A Review. *Elite Journal of HIV*. 2024;2(1):31-50.
128. Obeagu EI, Anyiam AF, Obeagu GU. Unveiling B Cell Mediated Immunity in HIV Infection: Insights, Challenges, and Potential Therapeutic Avenues. *Elite Journal of HIV*. 2024;2(1):1-5.
129. Obeagu EI, Obeagu GU. Hematocrit Fluctuations in HIV Patients Co-infected with Malaria Parasites: A Comprehensive Review. *Int. J. Curr. Res. Med. Sci*. 2024;10(1):25-36.
130. Obeagu EI, Obeagu GU. Transfusion Therapy in HIV: Risk Mitigation and Benefits for Improved Patient Outcomes. *Sciences*. 2024;4(1):32-7.
131. Obeagu EI, Obeagu GU. Mental Health and Psychosocial Effects of natural disaster on HIV Patients. *Sciences*. 2024;4(1):38-44.
132. Obeagu EI, Obeagu GU. Eosinophil-Associated Changes in Neonatal Thymic T Regulatory Cell Populations in HIV-Infected Pregnancies. *Elite Journal of Health Science*. 2024;2(1):33-42.
133. Obeagu EI, Obeagu GU. Advances in Understanding the Impact of Blood Transfusion on Anemia Resolution in HIV-Positive Children with Severe Malaria: A Comprehensive Review. *Elite Journal of Haematology*. 2024;2(1):26-41.
134. Obeagu EI, Ayogu EE, Obeagu GU. Interactions between Blood Transfusion and Antiretroviral Medications: Implications for Patient Care. *Elite Journal of Medicine*. 2024;2(2):104-15.
135. Obeagu EI, Obeagu GU. Maternal Eosinophilic Responses in HIV-Positive Pregnant Women: Unraveling Immunological Dynamics for Improved Maternal-Fetal Health. *Elite Journal of Immunology*. 2024;2(1):47-64.
136. Obeagu EI, Anyanwu CN, Obeagu GU. Challenges and Considerations in Managing Blood Transfusion for Individuals with HIV. *Elite Journal of HIV*. 2024;2(2):1-7.

Citation: Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. *Elite Journal of HIV*, 2024; 2(2): 43-59

137. Obeagu EI, Ubosi NI, Obeagu GU, Akram M. Early Infant Diagnosis: Key to Breaking the Chain of HIV Transmission. *Elite Journal of Public Health*. 2024;2(1):52-61.
138. Obeagu EI, Obeagu GU. Understanding Hematocrit Fluctuations in HIV-Malaria Coinfection for Improved Management. *Elite Journal of Public Health*. 2024;2(1):22-34.
139. Obeagu EI, Obeagu GU. The Impact of Erythropoietin on Preeclampsia in HIV-Positive Women: A Review. *Elite Journal of Nursing and Health Science*. 2024;2(1):21-31.
140. Obeagu EI, Obeagu GU. Platelet Distribution Width (PDW) as a Prognostic Marker for Anemia Severity in HIV Patients: A Comprehensive Review. *Journal home page*: <http://www.journalijar.com>.;12(01).
141. Madzime M, Rossouw TM, Theron AJ, Anderson R, Steel HC. Interactions of HIV and antiretroviral therapy with neutrophils and platelets. *Frontiers in immunology*. 2021; 12:634386.
142. Khawaja AA, Taylor KA, Lovell AO, Nelson M, Gazzard B, Boffito M, Emerson M. HIV antivirals affect endothelial activation and endothelial-platelet crosstalk. *Circulation Research*. 2020;127(11):1365-1380.
143. Laurence J, Elhadad S, Ahamed J. HIV-associated cardiovascular disease: importance of platelet activation and cardiac fibrosis in the setting of specific antiretroviral therapies. *Open Heart*. 2018;5(2):e000823.
144. Akinosoglou K, Kolosaka M, Schinas G, Delastic AL, Antonopoulou S, Perperis A, Marangos M, Mouzaki A, Gogos C. Association of Antiretroviral Therapy with Platelet Function and Systemic Inflammatory Response in People Living with HIV: A Cross-Sectional Study. *Microorganisms*. 2023;11(4):958.
145. Reno TA, Tarnus L, Tracy R, Landay AL, Sereti I, Apetrei C, Pandrea I. The youngbloods. Get together. Hypercoagulation, complement, and NET formation in HIV/SIV pathogenesis. *Frontiers in Virology*. 2022; 1:795373.

Citation: Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. *Elite Journal of HIV*, 2024; 2(2): 43-59