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Elucidating the relationship of gut-brain axis and integrity of blood brain barrier in context of cerebral malaria

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Plasmodium, the parasitic cause of malaria, is a global pathogen, annually causing many million infections and million deaths. As drug resistance continues, to develop, and no effective vaccine is available, it is critical to understand the factors underlying the severity of this disease. Recent publications have pointed to interactions between the gut microbiota and malaria. With this in mind, we have studied the role of the gut microbiota in cerebral malaria infection particularly its role in Blood brain Barrier Integrity. Members of the gut microbiota express the glycan Gal α 1-3Gal β 1-4GlcNAc-R (alpha-gal) on their surface, which induce anti-alpha-gal antibodies. Plasmodium sporozoites, but not merozoites, also express alpha-gal on their surface, and the presence of anti-alpha-gal IgM antibodies correlates with moderate protection against malaria in humans.

In addition, showing the direct link between human gut microbiota and plasmodium infection, gut bacteria also regulate the development and function of the immune system, metabolic and nervous systems through 'gut-brain axes. Blood brain barrier is the main site between brain tissue and host circularity system. During cerebral malaria the blood brain barrier become rapture and lead to the cascading effect of immune system like cytokine burst, which eventually result in cerebral edema? Gut bacteria directly affect blood brain barrier, which has components like microglia, astrocytes, and endothelial cells. Some SCFAs Producing bacteria restore the microglial morphology and function. *Bifidobacterium* spp. showed that these bacteria influence microglia development and activation. These all proof indicate the link between gut-brain axes and the integrity of blood brain barrier.

Conclusion: Vast information in literature shows that interaction between the gut microbiota and the host nervous system shapes the neurological processes. Majorly, the microbiota influences the development and function of the nervous system through modulating the immune response. During cerebral malaria infection host immune system play a major role in host defense. Some host microbes help in the host immune cells like microglia, astrocyte development. These cells are major part of the blood brain barrier. Therefore, probiotic bacteria will provide new, safe and effective therapeutic options for cerebral malaria mitigation.

Importance of Research: This research mainly focuses on gut-brain axis and its role in the blood brain barrier integrity during cerebral malaria. This study leads to potential probiotic development, used during cerebral malaria infection.

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Biography

Khan Shahrukh, PhD, is living in New Delhi, Bachelor of Science (Honors) Microbiology-2016 SSN College, University of Delhi, India. He has done Master of Science Microbiology-2018 Department of Microbiology, University of Delhi, India, PhD Neuroimmunology. Currently he is working on a project entitled - "Positive and Negative Host-Microbes Interaction during Malaria Infection".

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