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Editorial

Sialylated N-Glycan: A Biomarker for Depressive-Like Behaviors in Toxoplasma gondii Infected- Mice

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An exceptionally important brain parasite *Toxoplasma gondii* is associated with many psychiatric disorders. It was indicated that host defense mechanisms were involved in the development of anhedonic-and despair-like behaviors in *T. gondii* infection. The current operational diagnostic criteria of depressive-like behavior depend mainly on the physical symptoms of depression. Thus, biological correlates of behavioral changes during *T. gondii* infection are in demand with a novel biomarker. Recently, glycomics has been used to identify affected glycoproteins and pathways in depression. It would be interesting to investigate N-glycan structure as a novel approach to highlight the behavior of BALB/c mouse after *T. gondii* infection. This study aimed to investigate serum glycomics during; acute, chronic infection, after treatment with an immunostimulant indoleamine 2,3-dioxygenase inhibitor, 1-methyl tryptophan as well as in case of severe combined immunodeficient mice. Serum N-glycans were analyzed using glycoblotting followed by matrix-assisted laser desorption ionization-time of flight/mass spectrometry to demonstrate N-glycan expression levels. Both depressive-and sickness-related behaviors were significantly evident (P≤0.001 each) during acute infection of *T. gondii* in immunocompetent mice compared to controls. These behaviors of mice confirmed the immunostimulant and immunosuppressant pathway *in vivo*. The behavioral alterations were associated with high expression level of sialylated N-glycan, (two groups of Neu5Ac-terminals), m/z 2378 at Peak # 14 and (two groups of Neu5Gc-terminals), m/z 2410 at Peak # 15. Noticeably, only sickness symptoms were evident in immunodeficient mice infected with *T. gondii* as associated with high expression level (P≤0.001) of Peak # 15 compared to controls. The alteration of sialylated N-glycan expressions through the biosynthetic pathway is important to detect the immune status of animals against *T. gondii* infection. Moreover, 1-methyl tryptophan reduced depressive-like behavior (P≤0.001) compared to controls due to the downregulation of immune system activation. Therefore, sialylated N-glycan (Neu5Ac/Neu5Gc-terminal) is targeted to create a novel biomarker of sickness/ depressive-like behaviors.

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